The Builder.

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Architecture and the Tenure of Land.

It occurs at times to the technical, or to the scientific, writer that a subject foreign to his usual studies forces itself suddenly on his contemplation. Politics may be forbidden ground, and yet some great political change may take place, which altogether disturbs the course of business. Or some popular mania may arise, some period of unhealthy and gambling activity, or of unreasonable despondency, the cause of which is matter of no slight moment to all who live by the clink of the trowel.

It is thus that matters which are, strictly speaking, non-architectural, may at times assume considerable prominence in an architectural and social journal. The relations of the architect are so numerous that it is hard to draw the line, and to tell him with what subjects he is unfitted professionally to deal. Few kinds of study, for example, can be more distinctly separated than are architecture and physiology. Yet the laws of health require to be duly studied by the architect. The ventilation and warming of buildings, the construction of hospitals, the eradication of fever-beds and pest-plots in crowded cities, bring the builder into intimate relation with the physician.

Again, the subject of finance is one which comes home to every one. Want of money has been called, with much justice, the only engineering difficulty. The nobler labours of the architect are eminently expensive. Private opulence may at times seek to build for itself an appropriate home; but public buildings,—ecclesiastical, forensic, municipal, regal,—are those which demand the chief attention, and require the most cultivated skill, of the designer. It is thus that the builder comes in contact with the stock-broker, and that the course of the speculative fury of the day, the fall of banks, or the nursing into life of credit companies, has direct relation to industrial progress.

One of these occasions has lately arisen. The subject may at first seem non-technical; but it can only be so regarded on the view, that it is purely visionary. If we were to consider it, as many will do, as not entitled to receive serious consideration, we could find no room for its discussion in our columns. But the names of some of those who, with grave faces, and the *formulæ* of reason, urge the most novel argument against civilization, are too well known, and, we may add, are some of them too much respected, to allow us to pass by their views in silence, on the sheer ground of inherent self-contradiction. We allude to the theory that land cannot rightly be held as private property.

Were it possible for the hypothesis to which we refer, to take actual, practical, form, it would be an evil day for the craft of the builder. Architecture would founder, like a stricken vessel in a storm, beneath this heavy blow of the political economist. For the first requisite of the architect is the land on which to build. A firm hold on the soil is essential to the builder. Ownership, property,—call it by what name we like,—the old phrase, *cujus est solum est usque ad cœlum*, is as sacred to the man who would build a house, as it used to be to every man who regarded the freedom of his native land, and the unshaken stability of her institutions.

It is always a suspicious circumstance when a bald and imperative logic is brought to bear on an ancient opinion. The process of the logic may be unexceptionable, but fallacy usually lurks in the premisses. The great probability has in the first instance to be dealt with, that the habits and customs of our ancestors, as far back as we can distinctly trace them, are more true to the wants of our common human nature, than is the assumption, that all these habits are wrong, and that their origin is false and unnatural.

Instinct, in this matter, is at one with history. Nor is the instinct merely human,—it is common to all the higher forms of animal life, to most beasts, to many birds, even to some fishes. The instinct which leads the eagle to retain and to defend its eyrie, or the fox its den, is, of course, widely different in its development from that in accordance with which, man, emerging from barbarism, throws the shelter of law around his home; but the wide and imperative rule of the instinct cannot be disregarded by those who ask, "what is the teaching of nature?"

To occupy a portion of the earth's surface, to the exclusion of all other occupants, is the first step towards civilization. Nomadic tribes exist which have never struck root in the earth, but which, nevertheless, guard their hunting-grounds, or fishing waters, or pasturages, with jealous care. The Scythians are reported by Herodotus to have made their homes in wagons, so that they could be shifted at the desire of the occupant. The historian goes on to add, that the idea of the family, among these cryptogamic people, was as undeveloped and as uncomfortable as the idea of a home. The very act of sowing the ground implies the expectation of retaining its possession till the harvest.

The advocates of radical change in this matter reply, that the land is the property—not of the individual, but of the nation. Propose to them the historic investigation of a rather unintelligible claim, and they decline to meet you on that ground. They are not concerned, they will tell you, with what is, or what has been, but with what ought to be—at which they arrive by logic.

This, then, is the argument. The only ground of claim to private property in anything is, that it has been produced by labour. No man has made the land: therefore it is no man's private property.

Two methods exist of dealing with a theory. One is to examine its origin, the other is to trace its consequences. If the latter involve the impossible, either the reasoning or the premisses must be false.

Now to refer the origin of private property to labour, is, at all events, to beg the question. It cannot be proved that such was ever historically the case. The assumption is contrary to much that we know of human habit and of animal instinct. The proposition, then, can only be supported by some proof of its innate truth.

The idea of ownership is only a part, or a case, of a more general idea, that of *right*. Ownership of land means a right to its occupation and enjoyment, to the exclusion of every one else. Now, to say that all rights are created by labour alone, is pure nonsense. No one could gravely support such a thesis. The basis of right, in many, if not in most, cases, is contract, more or less explicit. Such, to say nothing of a higher sanction, is the marriage contract. The mutual right of husband and wife to the mutual enjoyment of each other's intimate society and fellowship, holds good against all the world. Is this a right created by labour?

As with the bed, so with the hearth. The first requisite for the establishment of the family is the roof-tree,—the spot on which the settler may rear his hut, if it be only one of logs. When the settler ceases to be solitary, he adds to the need of shelter, that of a temple for his faith, and a spot sacred to the repose of his dead. He acquires this by the same simple methods to which he has recourse for the supply of his other instinctive wants. In that primary state of society which always reappears where the proportion of inhabitants to soil is that of the unit to the million, man takes possession of a homestead by discovery, by occupancy, by enclosure, or by cultivation. Prescriptive right is of rapid growth in lands in which all that is not the scene of private cultivation is the hunting-ground of the wild beast; and prescriptive right to territory once created, its demise from occupant to occupant, or its transfer from owner to owner, is simple matter of contract. We may at this moment see, in the vast western wilds of America, how landed property originates.

All cases of oppression and injustice on the part of the owners of this description of property come under the same law with those of the abuse of wealth or power of any kind. The rich man owes an exact account of his stewardship, a more exact one than any earthly tribunal can demand. Whether he own acres, or ships, or mines, or gold, the principle is the same. The exactments of conscience are stern; but to carry them out, is beyond the power of the execution that issues from any human court. The interference of the State must, at all times, stop far short of the full demand of right. While property exists, bad men, as well as good men, will do as they like with their own; nor is the tenure of property likely to be destroyed because such is the case.

As, then, the tenure of land is, in its origin, like that of many other descriptions of property; and as it is, in its present state, dependent, like all other property, on the sanctity of contract; the only ground on which society can be asked to interfere with the law of so ancient a tenure is the public welfare. If the advocates of any agrarian redistribution (a word which recalls the Roman troubles in the time of the Gracchi, just 2,000 years ago), call upon the Legislature for aid, it can only be by showing, at the same time, the practicability and the necessity of the reform which they propose, or the certain and absolute amount of good, to the whole community, that will follow on the interference with the prescriptive rights of a portion of it. *A priori* right to interfere, there is none. The historic title of the landowner, his contract right to his land, the instinctive force with which man has ever clung to the soil, the fact that civilisation (as its name imports) is the work of the builder, and that the work of the builder depends on the tenure of the soil,—all these things are against the innovation. The would-be reformer has no shadow of an argument to adduce, if it be not the *Salus populi suprema lex*.

What, then, is the practical nature of the demand? What will the claimant have, if he obtain all he asks? Re-distribution, pure and simple; confiscation, with or without compensation, of the property of the present landowners, for the advantage of some undetermined future landowner. "The State is to be the owner," says the agrarian reformer. How will the notion of the State take effect?

Let us confine ourselves, in the first instance,

to the subject of land used for building, or in immediate connexion with residential purposes. What induces a man to build? The desire for a home for himself or for others. The purchase of land means, that the house which the purchaser builds on it shall be his castle. If his hold be for such a limited term as that of three generations, a ninety-nine years' lease, the mode in which the builder sets to work is feeble and unsatisfactory. Compare the stucco villas run up on property of this description with the house that a man builds for himself. What sort of cathedral, or palace, or court of justice, or gallery of art, or market, or school, or hospital, or important building of any kind, can be secured without a firmer hold on the ground than that of such a lease? How, moreover, is the State—the proposed universal landowner—to secure the builder? It will give him a lease. What are to be the terms of that lease? To ensure building of an architectural character, it must be a perpetual lease. How is the State to be remunerated? Is it by a yearly payment? Suppose the tenant to be a permanent defaulter, is the State to have the power of ejectment? If so, who would build? If not, who is the proprietor? Possession, in such a case, would be not only nine, but ten, points of the law.

Say that the State is to be secured by the payment, in the first instance, of a sum adequate to the redemption of a perpetual ground-rent. What is this but purchase of land? The State will have been made to intervene as the seller, and a new property will have been created for a new set of owners. That is all the difference. The builder must have a ΠΟΥ ΣΤΩ—with no land, no building, no ownership of land, there will be no building beyond the shanties of squatters.

It is perfectly true that instances may be pointed out in which the competition for a special site, for residential or for business building, is so keen, that large sums of money may be expended in the erection of houses subject to a heavy ground-rent; but the risk in these cases is considerable. The constant ebb and flow of fashion or of business may convert the Belgrave-square of to-day into the Leicester-square of 1888. No description of property, forty years ago, would have been thought safer than a good roadside inn on one of the great lines of metropolitan communication. What is such property worth now? The piercing of a new street, the adoption of an improved mode of travelling, the mere unchecked expansion of a great capital, may at any moment, and probably will, sooner or later, so change the residential, or raise the business, value of certain localities, that the householder will be unable to find a tenant at the mere rate of ground-rent and taxes.

Nor, were the risk less, and were the exception to prove the rule, can it be shown that any advantage would accrue to any one from the fact that the State was ground-landlord. Most tenants would think the reverse would be the case. As a source of public income, ground-rents would be expensive in collection, troublesome, and hazardous; in short, a bad form of tax. As respects the occupier, the only benefit he would derive from paying rent to the State instead of to an individual, would be the chance of being less strictly looked after.

The erection of houses is only a portion of the labour expended upon land, which will be ill, or not at all, attempted, without the existence of a firm, definite, sacred, tenure of the soil. Great works of all kinds,—docks, harbours, canals, roads, railways, — require to strike a root as deep as the very basis of society itself. Drainage and irrigation demand permanence of tenure for their execution. The application of steam to agriculture has led us to turn over a new page in the true book of political economy. The workmen who met at Brussels the other day were by no means blind to the fact that the peasant proprietor is anything but a national benefactor. The perpetual *amorcellement* of land, which Napoleon pointed out to Eugene as a sure method of reducing the mass of the country population to political subservience, is inconsistent with the use of the steam-plough. High farming, it is now fully admitted, can only be applied to large farms. A certain amount of agglomeration of land is necessary for every kind of culture, except that of the spade; and for the engineering of culture,—for all comprehensive and efficient draining, irrigating, sewage manuring, and thorough application of the steam cultivator, to answer, the size of a farm must be considerable. Then, again, it may be readily shown, that no legislative interference on the part of the State can actually amount to anything, except confiscation and re-sale. Landowners may be extinguished; but, if so, it can be only to reappear; unless cities and towns, public buildings and private enterprise, the routes of inland commerce, and the improvements of modern agriculture, are all to disappear with them.

When, then, a writer on political economy, even if he be one who is justly regarded as entitled to respectful attention, permits himself to say that the appropriation of land "is at the first aspect a usurpation on the rights of other people;" and when he adduces as reasons for such a dictum the statement that land is "a thing which no man made, which exists in limited quantity, which was the original inheritance of all mankind, and which whoever appropriates keeps others out of its possession," he not only argues with equal fairness against anything like a sacred tenure of most sorts of property, but, as far as he has any influence, strives to stop the progress of the builder. The objections are not special to land. "No man made" coal, though man wins it by labour. "No man made" timber, though man grows it on his land by care and patience. "No man made" the water-fall, which has been appropriated to drive a mill; and whoever appropriates the return of the seed which he has himself sown "keeps others out of its possession." Wild and sweeping statements, put forth with the assumption of logical exactness, that involve self-contradictions of this kind, bring contempt on the study of political economy, or at least on some of its students.

For all great works of modern civilisation, tenure of the soil is the *sine quâ non* condition. For all domestic architecture, for all attempts at climatic improvement, by action on rivers, fens, forests, lakes, and the like, the case is the same. For all farming worthy of the name, not only the definite tenure of property, but the tenure of property to a considerable amount by the same holder, is requisite. It will hardly, we suppose, be argued, that our present cities, towns, and detached dwelling-houses, are numerous and durable enough to serve the needs of our descendants for all time. Yet the opponents of landed property, if they had their way, would go far to make their renewal difficult, and their increase impossible. To the fancied syllogism, "no man can own anything that he has not made; no one made land; *ergo*, no one can own land;" must be added the corollary, "But on one can build without owning land; therefore no one must build." The same result will follow from the other clauses of the argument. For as "no one made" timber, and therefore as no one can own timber, no one can have a right to buy or sell timber, and therefore no timber is to be forthcoming for the builder. And as no one can appropriate even the manufactured article of brick, without keeping some one else out of possession, it is evident that we shall be reduced to living in tents, if our friend whom we have quoted has his way.

It is a painful and humiliating reflection that public speakers and public writers should gravely bring before the minds of the less instructed masses of society fallacies so transparent. From the very strength of the instinct with which man clings to the soil, any theory that appears to promise land for the million will be sure to stir very deeply the minds of the poorer and more dependent. We have, as we before hinted, two thousand years of experience on this head. But for men to make speeches in Parliament, and to write pamphlets and articles in newspapers, assuming, with all the forms of reasoning, the truth of statements that are not only unproved but incapable of proof,—not only non-proven but false,—is an evidence of the extremely fragmentary and imperfect character of the education of some of our educated men. When a man feels impelled to ejaculate,—

> "The world is out of joint. Oh, cursed spite,
> That ever I was born to set it right!"

he should, in the first instance, be very careful to take nothing for granted; and, above all, not to beg the principal question on which he founds his views. The lucid clearness of the first great English writer on the sources of national wealth was present in his thoughts, and, therefore, was evident in his style. Men have found it far easier to imitate, to some extent, the trenchant language of Adam Smith, than to emulate his patient and modest labour; but when such pseudo-logical statements encounter the calm good sense of the practised man of business, they find their natural level. He may be unable to expose their logical inaccuracy, but he is aware of their practical absurdity. Tell the man who is about to build a mansion that he can have no property in the land on which he is about to erect it, and he will desire his architect to seek another locality. The architect requires his ΠΟΥ ΣΤΩ as implicitly as does the geometrician. Tell him he shall not have the land, and he will reply that those who deny it to him oppose the very basis of civilisation, and would push back the European citizen to the wigwam of the Indian, the tent of the Arab, or the wagon of the Scythic nomad.

SKETCHES ON THE TWEED: KELSO.

The traveller who penetrates into the old Scottish Borderland by the North-Eastern Railway *via* Berwick-upon-Tweed, will traverse a tract of country rich, indeed, in natural beauty, but richer still in its historical monuments and battle-fields, with all their teeming elements of romance and all their stirring incidents of legendary lore. For some miles the railway route runs on the south bank or English side of the noble river, and here we pass, first of all, the ancient and ruined castle of Norham, its soft red freestone gradually crumbling into dust, but still standing boldy out and in high relief against the horizon of the Cheviot hills. A few miles further on, close under the magnificent site of Twizell Castle, the ancient bridge across the Till (which here falls into the Tweed) is still seen standing, by which the English army, under the Earl of Surrey, crossed to the battle of Flodden Field. Then we come on the northern bank to the pretty village of Coldstream (with its splendid stone bridge), suggestive of the name of a well-known regiment of Guards which General Monck raised here some 200 years ago. Between Carham and the Tweed, again, on the English side, stands Wark Castle, now the seat of Lady Waterford, one of the strongest and most celebrated of the Border fortresses.*

But, leaving these memorials of bygone ages behind, the traveller will, in process of time, arrive at the little Border town of Kelso, five-and-twenty miles or so from Berwick, — a town which is better known in English history than many a manufacturing burgh ten times its size and importance in the present day. Lying out of the ordinary track of the traveller and the tourist, Kelso is not so much known or visited, we think, as it deserves to be; for it is unquestionably an interesting town, — both from its historical relations and its present condition. One of the gravest faults we shall have to find with it we may as well dispose of at once. The railway station is miserably inadequate. This may be owing most probably to the fact that it is the common terminus of two companies—the North British on the north, and the North-Eastern on the south. But surely some extra provision in such a case ought to be made. It appeared to us that there were not sufficient shuntings for the separate trains coming, stopping, changing carriages, and returning; and it does seem strange, surely, that no provision is made on an important line like this for a through system of traffic. We suppose these things will be adjusted some day or another by the companies who are interested; although it may not be, perhaps, until two rival directors come into fatal collision, and are killed on the spot. But to proceed.

The first and most conspicuous object which meets the eye after crossing the magnificent bridge over the Tweed and entering the town, is the ruin — now, alas! sadly diminished and broken down—of the ancient abbey which gives the name to Kelso.† This celebrated monastery was founded by King David I. in 1128, and it

* "Wark Castle was given by Edward III. as a marriage present to the Earl of Salisbury; and was defended by his handsome countess against King David II. Edward arrived to relieve it after the Scots had raised the siege; and fell in love with its beautiful defender. The story is told at some length by Froissart."—*Murray's Handbook for Scotland*, p. 22.

† The etymology of the name is somewhat obscure. The accurate author of the *Caledonia* derives Kelso, originally from *Cailcow*, *i.e.*, a sandhill, in the Celtic language.—(*Chalmers's Caled.* p. 211.) In the celebrated letter of the Community of Scotland to Edward I., taken from Rymer (*Fœdera*, vol. ii., p. 471. New Ed.), the abbots of Kelso and Melrose spell their names in the monkish Latin of the period, De Kelquou and De Meuros.—See Tytler's "History," vol. i., p. 354 (Edit. Nimmo. Edinburgh: 1864), where the letter is printed.

was so far completed as to receive the tomb of the founder's son, Earl Henry of Northumberland, who died in 1152. The monks were of a reformed class of the Benedictines originally established at Tiron in the south of France; hence they were commonly styled Tironenses. Fifteen years before this foundation, King David, while still the Earl of Huntingdon, had imported these Tironensian monks into Scotland, and had settled them near his castle in Selkirk. But the principal residence of the Scottish kings at this period was the castle of Roxburgh; and accordingly when David succeeded to the crown, on the death of his brother in 1124, he soon removed the convent from Selkirk to its present site at Kelso, on the banks of the Tweed, and within a bow-shot of his royal castle. In consequence of its vicinity to the English border, Kelso suffered severely during the wars of the Succession; and it was reduced to its present, or rather its more recent, yet less ruinous, condition by the English troops under the Earl of Hertford in 1545. Although the Abbey was never of any great size, the abbots of Kelso long asserted and claimed the precedence in the hierarchy of Scotland, and even contended for superiority, as we learn from an able writer,* with the parent house of Tiron, to which this northern daughter had given more than one ruler. But we need not pursue its history. We have only to add, that after the Reformation, it came into the family of the Kers of Roxburgh. A low gloomy vault was thrown over the transept for the purpose of transforming the ruins, after the fashion of the period, into a presbyterian church. But owing to the ominous fall of a piece of plaster from the roof, and to the existence of an old prophecy of Thomas the Rymer, that the kirk should fall when it was full of people, the congregation deserted it in the year 1771. Afterwards it was converted for some time into a joiner's shop. Eventually the ruins were disencumbered of the rude modern masonry by the good taste of William, fifth Duke of Roxburghe. In 1823 the decayed parts were strengthened and repaired by subscription, and finally, about two years ago, the present duke had the ruins thoroughly repaired; and the tower which showed signs of decay over the principal archway, was strapped with strong iron rods.

The style of Kelso is that which it seems was usually adopted by David II., a mixture of Norman and Early Pointed. The church originally consisted of chancel, with aisles 60 ft. long; a nave about 30 ft., transepts, and central tower, about 90 ft. high. There are at this moment left only two arches of the south side of the chancel, the walls of the nave, with part of the west entrance. The main feature is the central tower, which was supported by four magnificent arches of Early Pointed age, two of which are still standing entire, and are at least 40 ft. high. The rest of the architecture is Norman; and the building is one of the few, we are informed by Mr. Billing,† in which the head of the cross lies to the west. One of the most remarkable features is the entrance to the north transept, which has a porch containing a small room, and this porch was the principal entrance to the parish church when the chancel was roofed in. Above the arch, which is deeply recessed and exquisitely moulded, there is a row of interlacing arcades, surmounted by a tympanum, of which the face is intersected in lozenge shapes.

Upon the whole, however, we must say that the architectural student will probably be disappointed in the study of what is left of the ruins; which, notwithstanding the efforts to preserve them, are gradually crumbling into dust. "Kelso Abbey," says the editor of its chartulary, "stands alone like some antique Titan predominating over the dwarfs of a later world." If simplicity of style and construction be any proof of this Titanic character, the learned editor may be correct, for in our opinion it is certainly the least erudite, if not the rudest, specimen of ancient ecclesiastical architecture we have seen in the whole Borders with the exception of Jedburgh. But "the churches of Jedburgh and Kelso as we now find them," says Mr. Fergusson, "belong either to the very end of the twelfth or to the beginning of the thirteenth century. They display all the rude magnificence of the Norman period—used in these instances not experimentally, as was too often the case in England, but as a well understood style, the features of which were fully perfected. The whole features were used with a Doric simplicity and boldness which is very remarkable; although it must be confessed that this independence of constraint was sometimes carried a little too far, as in the pier arches at Jedburgh where these are thrown across between the circular pillars without any subordinate shaft or apparent support. This was," he adds, "a favourite trick of the later Gothic architects of Germany, though seldom found at this early period. Here, however, the excessive strength of the arch in a great measure redeems its want of perpendicular shafts." We cannot, at present, dwell longer on the ancient abbey; we must proceed to say something about the town itself.

The town of Kelso is charmingly situated on the north bank of the Tweed, nearly opposite, or rather just below, the point of its confluence with the river Teviot. It lies, in fact, in the central plateau of a richly-wooded amphitheatre. It consists of four principal streets, and an open square or market-place in which are situated the Town-hall and the principal buildings. Like most towns which lie on the banks of a winding river, its thoroughfares are tortuous and irregular. But the principal square of the town is one of the finest and most spacious market-places we have seen in Scotland. The shops are also very good; and the houses throughout the town are generally built of the light pink-coloured sandstones of the district, and roofed with blue slate, imparting to its aspect, on the whole, a certain degree of architectural elegance and superiority, which vindicates its title to be regarded as a "pretty market-town"—a character which was ascribed to Kelso by Patten so long ago as temp. Edward II.* This character it still supports by a weekly corn-market, a cattle-market, and a wool-market, and four annual fairs. Indeed, it is a rather celebrated emporium for agricultural produce.

Kelso seems to occupy the site of what had been originally an inconsiderable village, a kind of suburb—as Gattonside is at this moment to Melrose—to the once important burgh of Roxburgh, which then lay on the opposite bank of the Tweed. It began to acquire more importance after the foundation of the abbey. During the reign of Robert I. it had increased so much as to consist of two parts, Easter and Wester Kelso; and on the final destruction of Roxburgh by James II., it naturally took the place and assumed the prominence of that celebrated burgh. The connexion of the town with the abbey necessarily made it a sharer in the fortunes of that ill-fated monastery; and, in fact, its history from the fifteenth century down to the era of the Reformation consists of nothing more than a detail of successive sieges and conflagrations. Whenever the abbey was assailed the town was attacked; whenever the former was set on fire the latter was sure to be burnt. Nor is there anything in Border history more remarkable than the manner in which its buildings (no doubt constructed chiefly of timber) were continually repaired and restored, so as to constitute the materials of so many and so closely consecutive conflagrations. Better days, however, dawned for Kelso. A new source of prosperity was opened up, and a new element of security obtained in the fostering care of the family of Roxburghe, who succeeded not only to the revenues of the abbey, but also to the seignorial jurisdiction of the abbots. All the benefits of a princely expenditure; all the advantages of a steady and impartial administration of justice, speedily followed. By the time of the Revolution Kelso had become the principal market-town of the south of Scotland, the chief resort of the neighbouring gentry, the seat of an eminent grammar-school, and a place of reputation as a seat of learning. It is now a rather busy, improving, and withal genteel country town, totally destitute of manufactures, yet ambitious of distinction; and not so notorious for ecclesiastical bigotry as some of the towns we could mention of equal size and importance in the northern part of Scotland. Indeed, the Kelso people, for what reason we cannot tell, unless it be due to their Border history and connexions, have always had a greater reputation for business than devotion. Thus Sir Walter Scott says of them on one memorable occasion:—

> "The Kelso men all slank away;
> They liked not much to hymn and pray,
> Nor like they't much unto this day!"

On the other hand, it must never be forgotten, that Kelso can boast of being the first provincial town in Scotland to adopt the printing press; and that it was here where John Ballantyne printed "sixty years since" the first edition of the celebrated "Border Minstrelsy," then unobtrusively announced "with notes and illustrations by Walter Scott, esq." How strange and unfortunate that a connexion so proper in itself and so romantic in its nature should have at length terminated so disastrously for them both!

We have already mentioned in terms of approbation the celebrated bridge which Sir John Rennie built across the Tweed at Kelso. There can be no doubt that it is one of the very best of our modern bridges in point of design; and had it been constructed of granite, or even of the hard Whinstone rocks of the district, it would doubtless have proved more lasting than the material, a soft and rather friable sandstone, which was actually employed, and which, we regret to record, even now shows evident symptoms of decay.

The view from this bridge is singularly beautiful. The junction of the Tweed and the Teviot on the left lends an imposing character to the broad and stately flow of the river, which is at this point 300 ft. in breadth; the lovely foliage of Sir George Douglas's seat of Springwood Park; the romantic old-fashioned town on the right, with the picturesque mansion of Ednam facing the bridge; and, lastly, the splendid architectural object of Floors Castle in the distance, surrounded with its towering trees and closely-shaven lawn, sloping to the very edge of the river,—all this constitutes a picture for which poor Leyden could find a parallel alone in that classic vale of Thessaly which the ancient poets have agreed in describing as the most delightful spot on earth:—

> "Green spangled plains to dimpling lawns succeed,
> And Tempe rises on the banks of Tweed,
> Blue o'er the river Kelso's shadow lies,
> And copse-clad isles amid the waters rise."*

Close to the bridge on the left is a massive gateway in the form of a triumphal arch, imitated, we suspect from the Marble Arch at Hyde Park, which guards the approach and avenue to Springwood Park. It is chiefly noticeable as a piece of masons' work; and it was executed, we understand, by the Messrs. Waddel, who are, or were at one time, great builders in these parts. A little higher up we observe a group of very tasteful cottages, with heavy triangular Gothic timbered roofs and finials on the gablets. The walls are constructed in the old-fashioned method of timber-framings, in squares of about 4 ft., filled in with random rubble, party-coloured and elaborately pointed. This, we observe is a growing taste on the part of cottage builders in Scotland. These are very nice examples of suburban cottages, and are obviously of English design,—at least, we never happened to see such designs proceed from a Scottish architect. But, after all, on this point we may remark that Kelso is much more like an English town, as far as its buildings are concerned, than a Scotch one. Whether this be due to the peaceful progress of "Anglo-Saxon civilization," which Mr. Matthew Arnold loves so well, we will not pretend to say. A more proximate cause, perhaps, resides in the inevitable results of the long centuries of Border warfare; but, at any rate, it is curious that there are no flats or common stairs in Kelso. Even in the poorest districts of the town, such as the Coal-square, the old houses appear to be constructed after the well-known English model, although we are afraid that more than a single family inhabit a single house. The ordinary plan of houses in the Market-square and Roxburgh-street is also that with which we are familiar in England,—a shop on the basement, cellars beneath, drawing-room on first floor, and bed-rooms above.

The modern churches of Kelso are either beyond or beneath criticism. The parish church, for example, is a hideous pentagon of some sort, covered with a circular roof like a Chinese pagoda. Compare this with Mr. Pilkington's ambitious effort in the Free Church, with its tall spire, its licentious treatment, and its elaborate naturalistic ornament, and one cannot resist

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* *Vide* the *Quarterly Review*, vol. lxxxv.; see also, "The Monastic Annals of Teviotdale," by Rev. Jas. Morton. This well-known author, although one of the prebendaries of Lincoln, was a native of Kelso. Compare Haig's "History of Kelso," and the able article, "Kelso," in the "Edin. Ency.," by Sir D. Brewster, who was a native of Jedburgh.

† In his "Ecclesiastical and Baronial Remains of Scotland." The dimensions and description are quoted at greater length than we have done in Mr. Murray's excellent "Handbook of Scotland," which we can cordially recommend. It is proper to mention that we have also derived some assistance from Black's "Picturesque Guide."

* See "The New Statistical Account of Scotland," vol. iii., p. 299.

* "Scenes of Infancy," p. 172.

the conclusion that with all their genius and resources the Scottish Presbyterians have sought for true architecture in their temples, but they have not yet found it.

The only public building worthy of notice in Kelso is the Court House and Exchange, which occupies the northern side of the Market Square. To the right of this building runs a street called the Horse Market; and on the left a parallel street called the Hay Market. From the Market Square runs a long straggling street called Roxburgh-street, almost equal in length to the celebrated long town of Kirkaldy, where Adam Smith was born. Passing up this street, close to the Free Church we come upon a most intolerable stench, proceeding, as we were told, from a "skinnery," whatever that may mean —certainly it has no connexion with a tan work, we should imagine. In this same quarter we also observed the ruins of the reservoir—a large cast-iron tank, which burst and did great damage some time ago. We were surprised to see it still unrepaired. Several narrow dingy alleys lead out of Roxburgh-street to the banks of the river; but near its western extremity we come suddenly upon the old-fashioned yet stately gates, the pillars surmounted with the ducal coronet, which guard the noble avenue to Floors Castle.

The day was far spent ere we could tear ourselves from that splendid mansion and those beautiful gardens. On returning to the railway station we took a last look over Kelso Bridge, and a passing glance at the massive archway of Sir George Douglas. Here we paused for a moment to observe the sculptured arms in the centre; two winged horses—the Pegasus—supporting the escutcheon of the well-known bloody heart; and the grim motto, "Doe or Die," reminded us that we had been travelling with much pleasure in peace and security through a district of country where this was at one time impossible.

STRATHEDEN HOUSE, KNIGHTSBRIDGE.

Those who recollect Stratheden House, when "plain John Campbell" lived in it, would scarcely recognise the interior now that it has become the residence of Mr. Mitchell Henry, the well-known wealthy and discriminating lover of the fine arts. Under the direction of Mr. Thomas H. Wyatt, as architect, and Mr. Frederick Sang, as artistic decorator, the rooms have been fitted up and furnished very elaborately, and, we may add, magnificently. In the Hall, which is still, unfortunately, low, the ceiling and frieze are appropriately embellished in encaustic colour, and a handsome tile pavement has been laid by Maw. A dual head, Diogenes and Socrates, a fine antique bust of Agrippa, and the Florentine Dogs, in Serpentine, are amongst the works of art it contains; while the walls of the staircase are hung with pictures, some of them originals and others copies of paintings by good masters. In the Dining-room the walls are covered with silk brocade; a lofty chimneypiece, of carved oak, in the style of the sixteenth century, has been built up, including some beautiful carving of the period. The ceiling, modelled in the same style, is embellished with allegories, Raffaellesques, and gilding. The woodwork of the Library is ebonized, with gold mouldings and ornaments. The ceiling, cornice and frieze, Venetian *Cinque-cento* in style, are partly on gold, partly on turquoise-blue ground. The panelled compartments contain arabesques in the borders and portraits of philosophers and poets. The walls are hung with heavy green silk from Lyons, as are those of the drawing-room. For the latter, the furniture, tables, chairs, consoles, and frames were modelled and finished in Rome and Florence after originals in the Pallazzo Pitti and in the Vatican. The walls of the Billiard-room are pale sea-green in colour, the woodwork being dark green with gilding. The ceiling, cove, and cornice are very elaborately embellished, Italian *Cinque-cento* in style. There is a remarkable carved settee in this room that once adorned a ducal mansion in Florence. The design of part of it is ascribed to Giulio Romano. A recess of this room, between marble columns, the back-ground of which is a positive Pompeian red, contains a statue of a flower-girl, by Wolf, of Rome. Other statues by the same sculptor, and a "Puck" by Lough, will be found elsewhere. As among the best things in the rooms we note a remarkably fine tea service of Sèvres china, painted with portraits, and originally a present from Louis XIV. to a member of the Visconti family. It is an exquisite result of the union of Art and Industry.

The principal addition to the house is in honour of sculpture,—a temple-like apartment or shrine, formed to receive Meli's noted group, "The Pompeian Mother," which was for some time one of the lions of modern Rome. The statue represents a woman who, unclothed, with the exception of some wind-pressed drapery behind, and holding her child in her arms, strives to escape the horrors of the destruction of Pompeii by Vesuvius. Her figure recalls Rubens rather than Raffaelle,—power rather than refinement; but any objection to this being yielded, the work must command great admiration. Rumour gives 8,000 guineas as its cost.

This temple and its approaches have been painted in the Pompeian style. The greater part of the back-ground is red and black, with animals, birds, scrolls, a rich frieze, a gilt dome, and a mosaic pavement by Minton. It is scarcely necessary for us to add that a very large sum has been expended on the works in Stratheden House.

POPLAR AND STEPNEY SICK ASYLUM COMPETITION.

The Poplar and Stepney Sick Asylum is to be built in Bromley, Middlesex, just opposite the Stepney Union Workhouse, a commodious structure, erected not long ago from the designs of Mr. Henry Jarvis. The Board of Management having invited a certain number of architects to compete, eleven have sent in designs for the proposed hospital, and the drawings are all very fairly hung in a room at the workhouse. The instructions required accommodation for 265 men and 345 women, on the pavilion principle; fifteen of the women being lying-in cases, and fifty of each sex being Foul cases. The instructions were in accordance with modern hospital principles, but the competitors were to suggest anything they thought desirable. The chief premium offered was 100*l.*, to merge into the commission, if the design be carried out, with 60*l.* to author of second best design, and 40*l.* to each of the other competitors. If we understand rightly, a reduced commission is offered to the architect who may be engaged, but of this we are not certain. We will hope we are misinformed. The site is a long narrow awkward piece of land, bounded by the Tilbury Railway on one long side, and by houses of very poor character on the other; and this, doubtless, increased the difficulties of the architects. The following is a list of the competitors, with the sum they put down as the estimated cost of their design:—

	£ ?
Messrs. Hills & Fletcher	33,000
Messrs. Giles & Biven	34,000
Mr. Wilson, Design A	35,000
" Design B	50,000
Mr. Bressey	50,000
Mr. Worthington	50,500
Mr. Scott, jun. (Add 1,500*l.* for Parian cement, deduct 500*l.* if floor in pine instead of oak)	50,600
Mr. T. Blashill (Including machinery and lifts)	56,500
Messrs. Hammack & Lambert	57,982
Mr. Morris	58,000
Messrs. Harston	72,000
Mr. Bracebridge (Exclusive of engineering works, fitting up laundry and washhouse, hydraulic lifts and fittings, laying out garden, &c.)	

Examiners of the drawings would fail to find the reason why the last-named design should cost more than double the sum put down for some of them at the top of the list, or why it should cost even one-third more than most of the other designs. The fact is, however, as we said in our last, speaking of a similar competition, these amounts are simply opinions founded on more or less previous experience.

The designs from which the managers will probably select the first two are those by Messrs. Harston, Messrs. Hammack & Lambert, and Mr. Wilson, (B.) Mr. Wilson's plan, at the closet end, is somewhat close and confined. Messrs. Hammack's elevation is poor. Messrs. Harston's is superior in this respect, as in some others, and if the apparent difference in price be reconciled may come out first, a result we should scarcely feel disposed to term erroneous, so far as we may depend on a superficial examination.

Mr. Thos. Blashill has sent two designs, on which he has evidently bestowed much thought. The plan is very good in several respects.

Mr. Worthington, by placing main corridor in centre, renders his wards too small for economical working. His elevation is agreeable. Mr. Bressey in designing a long ward, for bedridden patients, without a day-room, throws a doubt on his knowledge of the actual requirements of such an establishment as this.

Mr. Scott, jun., has given his buildings such an ugly aspect that his plan was probably less looked at than it might otherwise have been. Messrs. Giles & Biven, who have the whole matter at their fingers' ends, are less happy here than in some of their other designs. By placing the day-room at the *side* of the ward, and separating it from the latter only by a low partition, they not only take away a window from some of the beds, but give the same atmosphere in the day-room as in the ward. Mr. Wilson also in his general plan shows the day-room at side of ward, but a large alternative sheet with reference to this arrangement probably saved him from objection on that score.

ON MEGALITHIC MONUMENTS.

At the annual meeting of the Northampton Architectural Society, held recently, Sir Henry Dryden made some *viva voce* observations on

The Megalithic Monuments of Brittany.

The province of Brittany, he said, consisted of five departments, and if they looked at the map of France they would see that it constituted the great western promontory of France; and it was no doubt owing to its particularly promontorial position that so many of these ancient monuments had been preserved, for the arts of civilisation had not so readily obtained a position there, and therefore could not work in so destructive a spirit as in other parts of France. Of these departments Finisterre and Quiberon were the most rich in these monuments, although they existed in the other departments. The part in which he had been at work with Mr. Lukis was in Quiberon. The province of Brittany contained a large number of these megalithic remains. There were four kinds of megalithic monuments; first, *Menhirs*, which meant tall stones or pillar stones, of the tallest of which yet found he exhibited a drawing. The second kind were the *Dolmens*, which were chamber tombs, of which he only exhibited a drawing of one specimen. Thirdly, there were the *Circles*, of which there were several. He exhibited plans of the three principal—the circle of *Ménec*, the circle of *Kairverin*, and the circle of *Kerlescant*. There were a few more, but not many of them—perhaps one or two more; but he supposed there were not a dozen circles altogether in Brittany. Then there were the monumental lines of Erdeven, the principal part of which was near Carnac. The lines of *Ménec* were eleven in number, the lines of *Kairverin* ten, and the lines of *Kerlescant* thirteen. Now there was a very important point in the nomenclature of these things, which was very bothering. If they had to do with French antiquaries and their works they would find this difficulty. What we call a *cromlech*, the French call a *dolmen*; and what we call a *circle*, the French call a *cromlech*. These monumental remains had never been planned to any extent, and never been properly described. The number of people who had visited them was extraordinary, and therefore it was the more surprising that so little had been done to make them understood. He believed he had seen everything that had been written on the subject; and there was not a single thing to be relied on. His friend, Mr. Lukis, had seen more of the remains than he had. A strong reason why they should be planned was, that they were being destroyed as fast as they could be. He was in the district in September, 1867, and when he went again this year he found that many of them had been destroyed, and one of the most curious *dolmens* was being carted away. They were breaking up some of the others whilst he was there. As the plans he had taken were accurate, they would be of great use eventually. Very few of these remains were marked on the French ordnance maps, and not nearly so much interest had been taken in them by the French engineers as was the case in England. He should not say anything about the *dolmens*, for his friend, Mr. Lukis, had written a good many things about them, which would ultimately be published. They were chamber-tombs, and were all inclosed in immense mounds of earth first of all. There were lines and circles in other parts of Brittany,

but he should only describe those about Carnac. He had only planned part of these, for it would take two or three lives to measure and plan many of them. Some of these sets of lines had circles at the head, whilst others had not; but he could not say that there had not been circles at the head of the others. For instance, *Kerlescant* had one which was not placed symmetrically with regard to the other; and then *Kairverin* had no circle, and he did not think it ever had, because in the other cases the circles were on the highest ground, but in this case the lines went up to the point, and the ground began to sink directly after. Therefore he considered it never had any circle, as did Mr. Lukis also. As for the *Kerlescant*, the enlighted owner was carting it away as fast as he could; and since he had planned it much of it had gone. A good deal was carted away in the interval between his two recent visits. *Ménec* consisted of eleven lines, and no doubt never had more than eleven. *Erdeven*, he should think, consisted of eleven lines. The drawing which he exhibited represented the circle of St. Pierre. The distance between the circle and the corner of the lines was 290 ft., and the diameter of the circle was 180 ft. *Ménec* was very nearly a mile long, but Kairverin was the longest of them all. St. Barbe was about 900 ft. only in length, but they did not know exactly whether that was the complete length. They believed, however, that it was, and up at the top of it there was no circle now, but there were three enormous blocks which stood up at the head. Whether they were part of a circle, or whether they were only three blocks put at the top, one could not determine, but there was nothing like a circle. Neither was there anything like a circle at *Erdeven*, but there the circle, if one ever existed, might have been destroyed, because in making the Imperial road some of the end blocks had been mutilated, so there was great confusion; but still he thought there never was a circle. Some of the end stones of the circle of St. Pierre had been eaten away by the sea, for they had found some of the fragments on the beach. The circle of Ile Lanic was on a small island about a quarter of a mile from the coast, the whole of which was covered with Roman pottery. All along the little cliff, which was only some 4 ft. or 5 ft. in height, there were numerous specimens of Roman pottery, and other similar antiquities. Flint heads and arrow heads, and many such things, had been found, and no doubt others would be found also. The sea had encroached very much there. Mr. Lukis said it was very odd how so much pottery should have accumulated on a small island, and he raised the question, why did the people go there? He supposed it was likely it was once part of the mainland, and especially when they found, on sounding, that the channel between the island and the mainland was quite shallow. It appeared, therefore, highly probable that the sea had burst over the land, made the projection an island, and washed the circle away. It was not very different in diameter from the circle of St. Pierre, it being some 165 ft. All the writers who had made mention of those lines had treated them as if they were so many parallels, and Dean, in his "Serpent-worship," wanted to make out that all these lines favoured the hypothesis that they were temples for serpent-worship; but that argument would not hold water. In the case of every set of lines, the head was wide and the tail small. They began with big stones, and tailed down to little ones. The stones began by being some 8 ft., 9 ft., or 10 ft., perhaps, in diameter; and towards the end they gradually became smaller, till the diameter, perhaps, was not more than 4 ft.; the spaces between the stones and the lines remaining but slightly different. None of them were set out with mathematical regularity, but they were very wavy. The circle stones in all these cases were smaller than the line stones. Mr. Lukis wanted to know which were first erected,—the lines or the circles; whether the circles were added to the lines or the lines to the circles. They first of all thought that the circles, being the smallest, were first erected, and that the lines were afterwards added; but against that supposition was the significant fact, particularly in the case of the *Kerlescant*, that the circle—which, by the bye, he should have explained, was a horse-shoe shape,—was flattened to receive the head of the lines. That was conclusive against the circle being made perfect at first, and the lines being tacked on to it. It was much more likely the circle was tacked on to the lines, although the stones were much smaller. The Great Menhir, Locmariaber, was 67 ft. 5 in. in diameter by 13 ft. 6 in. wide. This was the largest in Brittany, and he supposed in France. The oddity of it was that, when it broke, the two fragments fell in opposite directions, as represented in the diagram. In one *dolmen* a gold collar had been found; and that single fact had done more harm to antiquities, and had resulted in greater destruction to the monuments, than the ravages of 200 years.

Various questions were put to Sir Henry, and in answering them he stated that the celts he had produced were undoubtedly later than the *dolmens* in which they were found. In many of the *dolmens*, Roman statuettes, coins, and other antiquities had been found. He further stated that in Constantia, Algiers, there were thousands of these *dolmens* only a few feet high. Some of them were 8 ft. high, 17 ft. wide, and 65 ft. long.

Monument in Scotland.

Mr. Samuel Sharpe described a *cromlech* or *dolmen*, which had been recently discovered in Scotland, and which he had visited, and sectional drawings of which were exhibited. He was visiting at a place in Airly, Forfarshire, where in the course of some agricultural operations a slab was turned up, which led to an opening with steps, which led down some 10 ft. beneath the surface. Immediately at the foot of those steps the passage curved and widened out, and extended to a distance of about 50 ft. or 60 ft. beneath the crown of the hill. They penetrated to the end, and in the course of conversation in which he inquired whether any inscriptions had been found in the *cromlech*, he was informed there had been none found. The extremity of the place was perfectly dark and dripping with water. It was almost like the dripping well at Knaresborough. But before they got out a stone was discovered. He should say that the width of the cavity ranged from 5 ft. to 8 ft. or 9 ft. The stone he had mentioned was about 8 ft. in length and 5 ft. in the other direction. Figures appeared on the stone. There was a large-sized serpent and a smaller one at right angles with that, and then there were several lines and the figure of a rudely-marked letter F, with other characters which were undecipherable. On the wall beneath this stone was a smaller one, upon which was the figure of a circle between two lines, and other lines similar to those which occurred in the *cromlechs* of Brittany, in greater or less number. On the floor were the remains of charcoal or other burnt material. It was stated that the *cromlech* had been discovered some hundred years previously. He should suppose that at that time it was closed up and covered with earth, and lost sight of altogether. It was known to be somewhere in that locality; and, from the description of the old and the character of the newly-discovered *cromlech*, he should think the two were identical. Near the entrance and on either side was a fireplace, with a chimney from 15 in. to 18 in. high. The stones were more clumsy than represented in the diagram, and had two uprights with a passage traceable from the bottom to the top into the open air. In the course of looking about he discovered a fragment of a quern, or hand-mill to grind corn, an illustration of the passage in Scripture, "Two women shall be grinding at the mill," &c. The suggestion which offered itself as to the reason of those remains of domestic habitation was this. The object of the *cromlech* in the first instance was a sepulchral one, and after being used by those who built it for that purpose it was doubtless discovered by other people and utilised by them so far as to make it a habitation; and hence the fireplaces, and the domestic utensil, the corn-mill. With respect to the lines, he regarded them as an evidence of the extension into Scotland of serpent-worship, as carried out on the greater part of the continents of Asia and Europe. With regard to the other characters, nothing was known except that, perhaps, they were intended to indicate the number of the members of a family that were deposited in the urn or burial-place. Possibly the F might be an indication of the family, but that was merely conjecture, and the same remark applied to the diagram of the other stone.

Kitchen Boilers.—By the explosion of a boiler in the kitchen of the United Hotel, Charles-street, St. James's, five female servants were seriously injured, and great damage was done to the premises. We postpone observations, in the hope of an official inquiry.

NEW BUILDINGS IN EDINBURGH.

It is a somewhat singular fact that amongst the numerous Gothic churches erected in Edinburgh within the last quarter of a century, there are only two possessed of really good Gothic character; and these two were designed by non-resident architects. This peculiarity may be accounted for from the circumstance that the local architects who have acquired a position, and to whom, as a matter of course, works of importance are entrusted, have been educated in the Classical school, which obtained a firmer footing in the "modern Athens" than in any other city in the empire. The Gothic revival has never been heartily acquiesced in by these men; it is as a new language to them, the grammar of which they have not mastered.

West Coates Church, Roseburn.

We some time ago gave a description of a Free church erected in the newly-created western suburb, called Roseburn; and our attention is now directed to another church in course of erection there in connexion with the Establishment. It is situated immediately to the east of the grounds of Donaldson's Hospital, and consists of a nave and transepts, with a spire in the centre of the nave gable, which faces the south. At the angles formed by the junction of the spire and nave and the nave and transepts, are octagonal turrets, which lead to galleries. The tower and spire will be 130 ft. high, and pierced by a three-light traceried window immediately above the doorway, and in the upper part by triplet lancet-windows. The spire is pierced by two tiers of gablets, and surmounted by a large finial and vane. The nave is lighted by double lancets, and in the north elevation is a rose-window of plate tracery, beneath which is the vestry; and on either side are two light traceried windows, and at the angles are massive buttresses, corbelling, and other features peculiar to Scottish Gothic are introduced.

The general arrangement and distribution of the parts show that a picturesque and grandiose effect has been aimed at; but the result is not quite satisfactory; the outline is rigid in parts, and the detail a mixture of various periods not happily combined. The church will accommodate 900 sitters, and the cost is about 8,000*l*. Mr. David Bryce is the architect.

Free St. George's Church.

That Mr. Bryce is more at home in the Classical than in the Gothic style, is shown by Free St. George's, which is situated within ten minutes' walk of the church above described; here all the details are thoroughly correct, although there is little originality in their application; and the faults are those inherent to the extreme Palladian. The site is at the angle of Stafford-street and Shandwick-place; the main entrance, which faces the south, being from the latter; the north elevation abuts upon a stable lane, and the east one is not visible from the street: the latter have not therefore been treated architecturally. The whole of the site has been built upon, and measures 78 ft. from east to west, and 125 from north to south. The principal entrance is flanked by coupled attached Ionic columns surmounted by a broken pediment, from the centre of which a great sprawling device crops out; above this is a range of arched windows with projecting keystones. On the side is a slightly projecting wing with a three-light square-headed window on the ground floor, and an arched window in the upper story; massive Corinthian attached columns rise from the basement story to the architrave, which, with the dentilled cornice, breaks over them. The wall head is finished with a balustrade, having pedestals at intervals to sustain vases. The tower is placed at the south-west angle, and is divided into four stages. The basement stage is 25 ft. in diameter, is rusticated at the angles, and rises to the main cornice, where it terminates in semicircular pediments embracing clock dials, which are ornamented with festoons of fruit and flowers, and a vase is placed at each angle. The next two stages consist of open arches supported by Corinthian columns and pilasters surmounted by enriched cornices; from the upper of these springs a pyramidal spire pierced with circular openings, and at the springing of the spire vases are again introduced. The west elevation consists of a centre having two ranges of rusticated windows, flanked by wings having attached Corinthian columns surmounted by triangular pediments, the outer mouldings of which are broken off before reaching the apex.

The interior contains, besides the church, committee and waiting rooms, and in the basement is a residence for the beadle, &c. The church proper is divided into a centre and aisles by iron Corinthian columns, supporting a series of arches upholding an elliptical ceiling, divided into square panels, with bosses at the intersections. There are galleries in the aisles, and at the south end opposite the pulpit. The ceiling over the galleries is divided into a series of domes.

The preaching platform occupies a small apse at the north end, and in the apse are three windows to be filled with painted glass. The roof of the apse, which is a semi-dome, is supported by granite pilasters, with foliated caps. Accommodation is provided for a congregation of 1,800, and the entire cost, including 13,000*l.* for the site, is about 30,000*l.*

The original Free St. George's, which was displaced by the operations of the Caledonian Railway Company, has been rebuilt at Stockbridge, with the addition of a tower, having a high-pitched slated roof. With this addition, and in its present situation, with meaner surroundings, the building has a much better effect than it had on its former site in the Lothian-road.

Bank of Scotland.

The scaffolding has now been removed from the Bank of Scotland, presenting the whole façade to the spectator. The transformation is complete; the once clumsy, badly proportioned building is now one of the most picturesque and imposing in the city. With its broken skyline of domes and groups of statuary, and standing as it does on neutral ground, between the old and new towns, it forms a link between the modern and formal architecture of the one, and the more irregular and ancient style of the other. The sculpture is not at all to our mind, and is much inferior to that on the Bank of the British Linen Company, which was designed by the same architect, Mr. David Bryce.

Castle Terrace.

The first instalment of the new buildings designed by Mr. James Gowans, in his own peculiar style, is now completed, so far as the elevations are concerned. The peculiarity of the style consists in the ignoring of every known detail and the application of mouldings more suited for execution in wood than in stone, the profile only of which is generally presented to the spectator. Much of the construction is false,—*e. g.*, arches are cut out of the solid and provided with stone tie-beams, where there is ample abutment. The general effect produced by the number of gables, moulded chimneys, and statues breaking the skyline, is striking and picturesque. Mr. Gowans, who is both architect and proprietor, deserves to be complimented on his pluck. He is feeling his way, and may improve as he proceeds.

Fruit and Vegetable Markets.

The new markets at Princes-street are progressing. Whatever objection may be made to the propriety of establishing markets on so fine a site, it is already evident that the rescuing it from the state of chaos it has presented for many years will be an improvement.

BRICKMAKING, AND DESIRED IMPROVEMENTS.

The committee of the "Manchester Society of Architects" has just now made a report on this subject, which, though to some extent local in its interest, has much in it that will be found generally useful, and is, therefore, placed before our readers.

The report was produced in consequence of the Master Builders' Association having requested the Society's opinion as to the desirableness of introducing brickmaking machinery into Manchester, or rather machinery of a certain description; and it is signed for the committee by Mr. W. R. Corson, president, and Mr. J. Murgatroyd, hon. secretary:—

The committee appointed on the 13th April, 1868, to consider and report on the methods of brickmaking in this neighbourhood, and to make suggestions with the view of obtaining better bricks than those generally in use, beg to submit the following report:—

They have examined and tested bricks from various crofts near Manchester, and several machine-made bricks, including those presented to them by the Master Builders' Association. They have also visited works at Bradford, near Manchester, where one of Bradley & Craven's machines is making bricks from coal shale; and also the works of Messrs. Platt, Brothers, at Oldham. They have had interviews with a deputation from the Master Brickmakers' Association, and with one from the Operative Brickmakers' Union.

Their inquiries led them to investigate particularly the fol'owing points in connexion with bricks and brickmaking:—

1. Regularity of shape.
2. Uniformity of size.
3. The size to be recommended as a standard.
4. Uniformity of material.
5. Density.
6. Power of absorbing water.
7. Ditto of retaining it.
8. Methods of manufacture.
9. Price.

Your committee has not thought it necessary to make experiments on the weight required to crush any of the bricks they have examined, such experiments on individual bricks giving no reliable data for calculating the weight that would crush a mass of brickwork.

Your committee may observe that the best stock bricks made in this neighbourhood seem nearly all that can be desired as to colour, regularity of shape, and quality, though the subsequent remarks will apply to them also, under the heads 2 and 9; and they have, therefore, more particularly directed their attention to the improvements necessary to produce the best common bricks for general use.

In the whole of the experiments your committee has used bricks of good, though not specially selected quality.

Table 1.—*Showing average Size and Weight of Bricks, with Quantity of Water absorbed. The results are the averages of several specimens of each kind by total immersion.*

Description of Brick.	Contents in Cubic Inches.	Weight.	Weight per Cubic Foot.	Water Absorbed by Total Immersion.		Per Centage of Water absorbed to the Volume of the Brick.
		lb. oz.	lb.	oz.	cub. in.	Per Cent.
Common hand-made, ten samples from various crofts near Manchester	103·5	6 9·25	109·75	11·6	20·05	19·38
Builders' Association, machine-made	140·12	8 15·5	110·6	19·67	34·0	24·26
Platt's machine-made	116·04	8 4·5	123·39	12·5	21·6	18·6
Hutchinson's machine-made	114·85	7 15·5	120·00	9·875	17·0	15·0

1. *Regularity of Shape.*—This is a most important point when, irrespective of appearance, the greater liability to fracture is considered, when the points of contact in built work are few. In this respect the machine-made bricks alone can be said to combine the qualities of true and parallel surfaces and general rectangularity, though they seldom maintain a good arris. The hand-made bricks are almost all defective in the above requirement, a large proportion being warped, bulged, rough-faced, and with very irregular arrises, proceeding partly from indifferent tempering of the clay, neglecting to pick out stones, the use of so soft a material in moulding that it becomes distorted in handling, the rough surface of the drying-ground, want of protection in drying, and the haphazard modes of burning.

2. *Uniformity of Size.*—This has an important bearing on the cost of brickwork, the number of yards of work set by 1,000 bricks being much less with bricks made from a stiff clay (which, from the quantity of water used in the manufacture, shrink in drying to a small size) than with those made from a more sandy clay, and when no difference in price is made on account of the increased or decreased size. Much difficulty and annoyance are also caused when calculations on bonding-faced work and ashlar dressings, that have been based on one size of brick, become nugatory on account of that size being used up, and when bricks from another kiln, and therefore probably of other dimensions, are brought to the building.

The method of manufacture is entirely to blame for this fault. From want of protection in drying, some bricks are partly washed away by the rain, often unequally so, or more on one edge than the other. It is also obvious that different-sized moulds should be used for different kinds of clay, so as to produce bricks, when burned, of uniform size with others. This matter appears to be entirely under the control of the master brickmakers; for although the operatives have, very properly, a standard maximum size, beyond which they will not mould bricks (10 in. by 5 in. by 3 in.), they have no objections to use smaller moulds; and, if their maximum size be used for stiff clays, others smaller should be used for more open ones. There is, however, a strong temptation not to do so, as full-sized moulds will produce a large brick from open clays that will be preferred by certain classes of builders. *The introduction of machinery, without graduating the sizes of the moulds, would therefore not obviate this objection;* and to introduce larger moulds than the maximum standard in one locality would only lead to their being used elsewhere, and thus the spirit of competition would unceasingly increase the size of bricks till they became too unwieldy for bricksetters to handle. It is a question for consideration whether stiff clays might not be rendered more open by an analogous mode to that followed in the Midland Counties and London, by mixing a more loamy clay, or breeze, or sand with them.

It is also well known that different-sized bricks can be made even from the same clay, under different conditions of tempering.

3. *The Size to be recommended* for the bricks when burnt, so that all shall be uniform, from wherever procured, should be one that would not be too large nor too heavy for a bricksetter of average strength to handle, and such that two brick breadths should, with the mortar joint, equal one brick length, and three thicknesses, with the joints, equal to the same dimension; and taking into consideration the size that can be procured from stiff clay, it would appear that 9 in. by 4⅜ in. by 2⅛ in., or 110¾ cubic inches, would be the best for general use, and such bricks would set, exclusive of waste, exactly 11 yards of 9-in. work per 1,000. Some bricks, made from stifl clay, are a little less than this; but a proper amount of attention in tempering the clay stiffer would no doubt bring it up to the size required, if so managed that the freshly moulded brick should contain about 27 per cent. of water instead of 33, which it often does now We may here mention that the cubic contents of the bricks made in the neighbourhood of Manchester range from 94 in. to 115 in., averaging about 104 in.; that Messrs. Platt Brothers' bricks average 116 in.; the sample bricks submitted by the Master Builders' Association, 140 in.; and Mr. Hutchinson's, 115 in.

4. *Uniformity of Material.*—Want of attention to this requirement is the cause of many of the faults alluded to under No. 1. We find stones not properly picked out of the clay, and bricks burst or bulged in consequence. There is also frequently an incomplete mixture of clays of different strata, with bands of sand or other foreign materials in them, and consequently a varied mechanical and chemical composition of different portions of the same brick. A more effectual sorting of stones, &c., out of the clay, and more careful casting and tempering, whether by means of a pug-mill or otherwise, are absolutely indispensable to achieve improvement in this respect, whether the bricks be intended to be made by hand or by machinery. Grinding the clay by means of rollers would not seem to be desirable where limestone is present; to crush up which amongst the material would only be to more thoroughly disseminate centres of destructive force, ready to burst the bricks on the admission of moisture.

5. *Density.*—While on the one hand it is desirable that appreciable hollows should not exist in the texture of a good brick, neither on the other is it desirable to so compress the material as to totally exclude air, and thereby not only render its proper burning difficult, but also make it so heavy in proportion to its cubical capacity as to be tiring to handle, expensive in carriage, and the cause of increased outlay where structures are to be carried on iron beams, or for arching, &c. The bricks submitted by the Builders' Association compare well in this respect, the weight of a cubic foot being 110¼ lb., while the average of hand-made bricks is 109¾ lb.; of Messrs. Platt's, 123½ lb.; and Mr. Hutchinson's brick, 120 lb.

Hardness is not necessarily commensurate

with density. The Builders' Association brick, though little removed in density from the hand-made one, is very considerably harder, while the most dense of other machine-made bricks appear rather wanting in toughness. It appears, indeed, to your committee, that the more the tempering and kneading manipulations of the clay are dispensed with, the less probability is there of a tough homogeneous brick being produced.

Table 2.—*Rate of Absorption, the Bricks placed on Edge in ¾ in. Depth of Water.*

Description of Brick.	In ½ Hour.	In 1 Hour.	In 2½ Hours.	In 14 Hours.
A particularly good brick from Bradford, near Manchester, absorbed of the total quantity (8¾ ozs.), which it took up ultimately	Per Cent. 44	Per Cent. 56	Per Cent. 70·6	Per Cent. 100
Builders' Association brick (20¼ ozs.), ditto	30	55	85	100
Platt's light-coloured (12¼ ozs.), ditto	41	75	98	100
Hutchinson's machine-made (8½ ozs.), ditto. (Saturated in thirty-eight hours)	33	36·4	50	75·75
A good hand-made brick from Hulme (8 ozs.), ditto	47	59	68·75	90·5
A good hand-made brick from Collyhurst (14¾ ozs.), ditto	40·75	64·4	95·0	98·4

Table 3.—*Showing the actual Quantity of Water absorbed per Cubic Foot of Brick at stated Intervals the Bricks being placed ¾-in. on Edge in Water.*

Description of Brick.	Weight per Cubic Foot, Dry.	Contents.	Quantity of Water absorbed per Cubic Foot in ½ Hour.	1 Hour.	2½ Hours.	14 Hours.	Full Saturation.
	lb.	ins.	oz.	oz.	oz.	oz.	oz.
Platt's machine-made	123·157	117·00	73·85	132·93	177·24	180·93	180·93
Builders' Association do.	114·6	136·4	76·014	139·35	218·54	253·38	256·54
Hutchinson's do.	118·75	111·64	38·69	46·43	58·042	96·73	127·62
Bradford, near Manchester, hand made	111·65	100·6	64·41	81·58	103·056	145·996	150·29
Hulme do.	113·69	95·6	67·78	85·85	99·41	131·043	144·6
Collyhurst do.	112·94	100·4	103·26	163·5	240·95	249·55	253·86

Table 4.—*Rate of Drying at about 65 Degrees Temperature.*

Description of Brick.	In 4½ Hours.	In 1 Day.	In 2 Days.	In 3 Days.	In 4 Days.	In 5 Days.	In 6 Days.	In 11 Days.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
The Builders' Association brick had lost of the total volume it had absorbed (20¼ oz.)	8·6	32·1	50·6	69·1	81·4	86·4	00·1	96·3
Platt's light-coloured (12¼ oz.)	4	34·7	61·2	75·5	81·6	85·7	89·8	96
The hard Bradford brick (8¾ oz.)	8·57	42·9	68·6	78·0	81·0	82·9	...	94·3
Hutchinson's brick (8½ oz.)	...	50	63·6	72·7	76·4	78	83	83
Collyhurst ditto (14¾ oz.)	3·4	30·5	54·2	74·6	81·3	86·4	89·8	91·5

6 *and 7. Power of Absorbing and Retaining Water.*—The annexed table will show the relative values of different bricks in this respect. For the purpose of securing dryness of dwellings, &c., the brick which imbibes the least moisture, and that the most slowly, and which parts with it most rapidly, is the most desirable: not only will there be less probability of driving rain penetrating walls under such circumstances, but the action of frost must be less injurious than when it attacks a material whose pores are filled with moisture. It will be observed from the experiments with bricks laid on their edge in water, that all kinds except Mr. Hutchinson's will become saturated for all practical purposes within fourteen hours — Messrs. Platt's, indeed, and one from Collyhurst, in two hours and a half;—that the quantity of water absorbed is not, as might have been expected, in inverse ratio to density; Messrs. Platt's, the most dense, absorbing 18·6 per cent. of their bulk of water; Mr. Hutchinson's 15 per cent.; the Builders' Association brick 24¼ per cent., and the hand-made bricks varying much, but averaging 19·38 per cent. The *rapidity* with which the water was absorbed was most contradictory; the Builders' Association brick, which in the first quarter of an hour had absorbed 30 per cent. of its total quantity, as against 47 per cent. of that of the Hulme brick, had at the end of two hours and a half surpassed the latter in the ratio of 85 per cent. to 68¾, though even then far behind Messrs. Platt's, which had absorbed 98 per cent., being nearly saturated. It will be observed from the tables 2 and 3, that some bricks, though they absorbed in a given time a larger proportion of their total capacity than others, yet where that capacity was small the actual *quantity* taken up might be less, and as the penetrating effect of damp must be gauged by the latter characteristic, it will be seen that the position of the different bricks as to quantity absorbed in a quarter of an hour, one hour, two hours and a half, and fourteen hours, was pretty uniformly thus:—1st. Mr. Hutchinson's (least); 2nd and 3rd. Hulme and Bradford; 4th. Messrs. Platt's; 5th. Collyhurst; 6th. Builders' Association (most). The majority of the bricks, when immersed, absorbed the water more rapidly at their sides and ends than at the top and bottom beds, as shown by the air-bubbles: this would seem to point to the desirableness of applying pressure, in moulding, in a different direction to that in which it is generally done. In testing the facility of parting with water, the bricks, after being saturated, were left to dry at a natural temperature. Messrs. Platt's and the Collyhurst bricks lost in the four hours and a quarter only about half of what the others had done; in four days they were all nearly on an equality, and after that time the Builders' Association brick and Messrs. Platt's surpassed the others in rapidity of drying.

In the earlier stages of the drying process, the order in regard to rapidity is—Hutchinson's, Bradford, Platt's, Association, Collyhurst; and in the latter stages—Association, Collyhurst, Platt's, Bradford, Hutchinson's. Thus the bricks which parted most eagerly with their moisture at first, were the longest in drying, and *vice versâ*. At the end of eleven days none were *perfectly* dry, from ½ oz. to 1¼ oz. water being retained.

8 and 9. *Method of Manufacture.—Price.*—From the foregoing remarks, it appears that the following points require attention to improve the character of the common brick:—

a. Greater care in cleaning the clay, and in thoroughly tempering it.

b. Variation in the size of moulds, so as to produce uniform-sized bricks from various clays.

c. Moulding the bricks with material of such consistency that it may not become misshapen by the effects of its own gravity.

d. Greater regularity of surface of the drying-ground.

e. Protection from extreme variations of temperature and rain in drying.

f. Less frequent and more careful handling in the process of drying, so as to preserve the edges.

g. A means of burning whereby the amount of firing shall be under control.

On points *e* and *g*, it would appear that wherever outlay has been made by brickmakers towards this end, whether by covering the "walled" bricks in drying by boarded copings, roofing over the clamps to protect them from rain, or shielding them from the action of the wind, a proportionate improvement in quality of the bricks, and a diminution of waste, has followed. Attention should, however, be directed to still greater protection during the earlier stages of drying, and to some method of burning in properly-constructed kilns, where the amount of firing shall be under control, and the "live holes," or firing-up apertures, so shielded from the wind that the heat may not be driven here and there uncontrollably by it. The present system of burning common bricks by so-called "close fires," where the bricks are interspersed with layers of fuel, appears particularly objectionable and wasteful, giving uncertain and incommensurable results for the fuel used, besides certain distortion and inequality of colour.

The systems of burning at Messrs. Platt's and at Messrs. Livesey & Johnson's, at Bradford, by kilns built in compartments, the latter being "Hoffman's" method, and the former an approximation to it, so that the waste heat from one division may be turned into the adjoining ones before commencing to supply them with fuel, both point to drying or completing the drying of the bricks by means of waste heat, and both seem to be economical and satisfactory in results. Your committee is well aware that either system is beyond the means of most brickmakers, and would only be remunerative where a very considerable quantity of clay is at hand. But it seems a question for fair consideration, whether bricks should *necessarily* be made and burned in immediate proximity to the spot where the clay is obtained.

It is not at all improbable that the additional care and attention shown to be requisite can be carried out without enhancing the price of hand-made bricks. They are at present sufficiently dear; and if machinery could produce an article superior in the most important requirements, and but little inferior in others, at a much lower price, its introduction would no doubt be welcomed by all engaged in building operations, to whom a reduction in the price of material would be some compensation for the constantly-increasing cost of labour. It must not, however, be forgotten that the increased care recommended would diminish the enormous waste and the difference in number between the quantity of bricks actually moulded during a season, and the number that are ultimately delivered to the consumer fit for putting into a building, and would thereby bring a proportionately greater profit and reduction in price at the same time.

Bricks of good quality should be of a uniform size, say 9 in. by 4¼ in. by 2½ in., and should weigh at the rate of about 110 lb. per cubic foot, or about 7 lb. each.

They should be rectangular, with true faces, and only the sides and ends need be smooth; the arrises should be sharp and straight.

No print sinking on either face.

They should not absorb, when saturated, above 20 per cent. of their bulk of water, and should absorb it reluctantly, and part with it with facility at ordinary temperatures.

They should be uniformly burned, and have a metallic clang when struck together.

They should be tough and "pasty" in texture, and not granular, so as to require repeated blows to break them, rather than one single hard blow. Superiority in this respect will cause the bricks to retain their entirety and sharpness of their arrises in carting and handling.

The hand-made bricks cannot, as at present made, be relied on for complying with the above requirements, though some closely approach the standard of size, weight, powers of absorption, and toughness; but they are unequal even when from the same ground, and very much so when those from one ground are compared with another; in the other requirements they are generally very deficient.

With regard to the machine-made bricks, Messrs. Platt's process would not appear to be practically introduceable in the neighbourhood of Manchester for the manufacture of common bricks; for though they might be produced by it at a low price and of generally uniform quality, yet its merit consists as much in the preparatory processes as in the moulding machine; and the immense extent and cost of providing for these, places it beyond the reach of any but those possessed of considerable capital; and it might be necessary, where the beds of clay are thin, to bring the material to the manufactory from a considerable range of ground.

The bricks presented by the Master Builders' Association comply with the majority of the qualifications, and in most respects are superior to the bulk of hand-made ones; but they should be made smaller, to comply with the standard size, and their somewhat granular texture, as well as the friability of the arrises, and immense absorptive powers, point to the necessity of some method of improving the tempering of the clay.

The bricks made by Mr. Hutchinson's process seem, in many respects, the best your committee has had the opportunity of examining. They are sound, homogeneous, not granular, and possess a surface well adapted for making a good mortar joint; their low absorptive power is also

a recommendation, and they present a good surface when cut and rubbed, and we understand that they can be produced at a reasonable price. They are somewhat heavy, and would, we think, when required for fire-proof floors or walls supported on iron beams, be improved by any treatment tending to lighten them. The process also requires improvement to secure greater rectangularity and uniformity of burning.

Your committee might have extended this report by giving various details of the different modes of manufacture, but they are of opinion that the immediate object of their appointment will be secured by the particulars they have given. It now rests with the manufacturers to determine in what manner effect may be given to these recommendations, bearing in mind, however, that though lowness of price is an important consideration in itself, yet that equality of size of bricks and reliable excellence of material are of much greater importance to architects.

THE "BUILDER'S" LAW NOTES.

Alteration of Drains.—In a case where the vestry or district board of a parish or district, under the powers conferred on them by the Metropolis Local Management Act, substitute a new sewer in a course different from that of an old one, and think proper to divert house-drainage (not in itself deficient or insufficient) from the old sewer to the new one, they are bound to provide new drains for the old ones so diverted, and are not entitled to call upon the owners of the premises to pay the expense of such new drains.—*Viret* v. *Vestry of Marylebone.*

Repair of Sewers.—The local authorities of a district are bound to lay down a sewer in such district when necessary, and to keep the same in good and serviceable repair. It has been decided that the expression "repair" does not mean the reconstruction of a sewer which has been originally defectively made, but the keeping of the original sewer in proper repair. When, therefore, the Court of Queen's Bench issued a mandamus requiring certain guardians to put a sewer within their district in good and serviceable repair, it was held to be a sufficient answer that the sewer which had originally been constructed by another board had been defectively made; that it was not such a sewer as was required by the law, and that in consequence of its defective structure it could not be put into good and serviceable repair.—*The Queen* v. *The Guardians of the Epsom Union.*

Taking Possession of Houses.—The Commissioners of Sewers cannot take compulsorily the whole of a house unless they have first in due form adjudged that possession of the whole house is necessary for the purpose of executing their powers in the best manner.—*Thomas* v. *Daw.*

Public Health.—A mandamus directed to a local board of health stating that a sewer is in such a state as to be a nuisance, and commands the local board to cleanse it, cannot be enforced, as it does not show, according to the "Public Health Act, 1848," that the person causing the nuisance, or the owner or occupier of the premises where it exists, has failed to comply with notice to remove it.—*The Queen* v. *Godmanchester Board.*

LIGHT AND COLOUR.

I SHALL willingly wait for Mr. Thomas's exposition of the views he entertains on light and colour; and would be among the first to congratulate him if his promised experiments add anything to the discoveries of previous observers. At the same time I do most sincerely entreat him to make himself more fully cognizant of the truths which are known respecting light and colour, or (if he prefers the expression) of the principles of the undulatory theory. It surely must be worth while for any one who purposes to publish his own thoughts on such a difficult subject, to know accurately those conclusions at which the best philosophers of the present century have arrived, especially when we know that the most brilliant discoveries of the age have arisen, directly or indirectly, out of that theory, which now seems to promise more than was ever before hoped from it. Who does not admire the new and refined method of chemical analysis, by examining the powers which different substances possess of destroying waves of light of particular periods faster than others, as indicated by the absorption-bands in the spectrum of the light they transmit? Who would have supposed, a few years ago, that the nature of many of the constituents of the sun, and even of the distant stars and nebulæ, would have been revealed by the mere fact that their light is deficient in waves of certain periods? Or that whether a comet or other heavenly body shines by its own or by reflected light, should be read in the directions of the vibrations of which its light consists? Yet the truth of these and many more such results depends entirely on every separate wave maintaining its period of vibration invariable, however far it has travelled, and whatever different media it has traversed;* and that in homogeneous media even the very directions in which the vibrations are performed along every ray, are preserved—doctrines which Mr. Thomas seems unwilling to admit, though their rejection would make as great a muddle of the whole science of light as he seems to suppose the various distinct vibrations to compound in the pure etherial firmament.

When one of the scientific observers now so ardently engaged in following up the clue lately given by the science of light to find out some of the mysteries of the universe, receives through a narrow slit a beam of light from a distant nebula, causes it to pass through a train of prisms till, as he supposes, its various component rays of different wave periods are widely but variously bent from their initial direction, and diverge from each other sufficiently to allow of the accurate determination of their positions in the spectrum; and when viewing their spectrum through a telescope, he finds that these rays are (for example) precisely the same as the peculiar rays emitted by incandescent hydrogen and nitrogen gas, and thereupon announces that the said nebula consists of such incandescent gases; or finds that its several rays are each slightly more refrangible, or less refrangible than certain corresponding rays emitted by the same gases, and therefore calculates, that if the nebula consists of those gases, we are approaching to, or receding from, it at a certain rate; always relying implicitly on the doctrine that the rays he operates on have retained their wave-periods invariable ever since the waves first started on their marvellous journey of perhaps a thousand years;—may we believe him? Or must we think, with Mr. Thomas, in his last letter (October 10), that the supposed great discovery of Newton about the prismatic rays is but one of his "infelicitous conjectures;" and prefer with the same writer in his former letter (September 19), to believe that not separate vibrations issue from the luminous body, but only "a general vibratory motion of the elastic medium, which modified by the prism or other means produces in us all the varieties of light and colour?"

I can hardly believe, however, that one who shows such a liking to science as Mr. Thomas does should really mean to dispute any of its great fundamental principles, though his language implies as much. How could he hope to explain the magical influence by which, for instance, one and the same prism could modify any single kind of general tremor in so many ways, and cause it to produce in us such various sensations of colour, with such wonderful constancy, when we examine with it the light that proceeds from different bodies? What would be the use of so Quixotic an enterprise as to attempt the overthrow of a science built up by such slow degrees, with painful labour of thought and patient observation, by the master-minds of the last two centuries? Would it in the least forward any theory of numerical proportion being at the root of chromatic harmony? Would it not rather take away the only means of proving the existence of such a proportion? It seems more likely that the difficulty felt in accepting this part of the undulatory theory arises from an imperfect acquaintance with it; and the manner in which Mr. Thomas writes again in his last letter about rays, asserting that Newton's "supposititious bundle of an infinite number of rays has been transplanted to the undulatory theory," where it appears to him much more "cumbrous and improbable" than in its original domain; and asking, "What is the diameter of that bundle? What its form of section? What the disposition of its fasciculi?" shows that he has no accurate conception of what is intended by those terms, especially as he adds, "These are questions which I have never seen touched upon, much less solved." Let me then again state that rays, in the undulatory theory, are nothing but imaginary lines, everywhere perpendicular to the advancing surface of the wave; and as every wave, so long as the medium through which it travels is of uniform density and elasticity, must spread with equal velocity in every direction from its origin, and therefore preserves a spherical form, these rays must also so long continue to radiate in straight lines from their source. But if part of a wave enters a medium which it cannot traverse with the same velocity, its surface is necessarily broken, and loses the spherical form, and the rays are bent accordingly from their original direction according to the law of refraction; and a reflected wave is also sent from the second medium back again into the first, causing rays to return according to the law of reflection.

Having acquired the idea of a single ray of light as the line perpendicular to the surface of the wave at a certain point, and indicating the direction in which the disturbance which constitutes the wave at that point is propagated, it is not difficult to explain what is intended by a beam or pencil of rays, simple or complex:—

First, suppose a single wave, or a succession of hundreds of waves, all of the same period, given out by a single shaken or vibrating atom, in the luminous body, just as a struck nail, or bell, may send out a single wave or a succession of waves of sound through the air.* The lines drawn from this atom to all points on the surface of the pupil of the eye, or in the orifice of an opening through which the light emitted by the atom shines, will be a bundle or pencil of homogeneous rays, which if the atom is distant may be regarded as parallel.

Next, suppose the same effect to take place in a great multitude of similar atoms, near together. The pencil of nearly parallel rays will now be composed of a number of subordinate bundles or "fasciculi," each proceeding from its own distinct origin. It will, however, still be a pencil of homogeneous light.

Thirdly, suppose that these several atoms do not all vibrate with equal rapidity, but at two, three, or any number of different rates. Our complex pencil of rays will now be heterogeneous, composed of a number of subordinate bundles, each of which separately would excite the sensation proper to its wave-period, but which altogether excite the sensation, either of whiteness or of some other colour, in which all the sensations proper to the separate bundles of rays do in fact co-exist. When such a complex beam traverses the prism, the several subordinate bundles of rays of which it consists, being differently refrangible, diverge at different angles from their original direction, and give us the spectrum proper to the peculiar light emitted by the congeries of atoms from which it proceeds.

Lastly, suppose a constant succession of shocks agitating the same set of atoms or other sets which come (one after another) into nearly the same positions, without which our light would be like that of a lightning flash, which does not continue for the billionth part of a second, though the sensations it excites continue much longer. We have then exactly the case which is commonly presented to us in nature. Take a portion of the flame of a burning candle. A stream of atoms of incandescent gases sends out waves of some particular periods, which excite the sensation of blueness perceived in looking at the lower part of the candle-flame, and give a spectrum consisting of a few bright lines, separated by dark spaces; but the myriads of incandescent particles of carbon, like those of other solids, send out waves of all periods, and the more intense the heat of the flame the greater is the proportion of the shorter waves, as Professor Tyndall has lately so clearly pointed out. Hence the part of the flame where they abound gives a continuous spectrum, in which

* The demonstration of this, on dynamical principles, in respect of waves in general, was first given by Newton, who also showed that their velocity in any medium depended on the ratio of its elasticity to its density, and that their intensity diminishes as the square of their distance from their origin increases. Unfortunately, perhaps actuated by some jealousy, for he was not exempt from human weakness, Newton too hastily refused to admit the possible application of the undulatory hypothesis to light when suggested in an imperfect form by Huygheus: though in his most ingenious endeavours to apply a corpuscular hypothesis (always treating it as an hypothesis only), he was forced to call in the aid of ethereal vibrations, to account for effects now known to arise from the interferences of waves.

* Mr. Airy, in his treatise on the undulatory theory, supposes that there are always a succession of some hundreds at least from each centre of disturbance.

(as might be supposed from the colour of the flame) the rays which produce the sensation of red are most intense or numerous, and the more refrangible rays occur in proportions far less than in the lime light, the magnesium light, or the solar light.

None have yet attempted to number the centres of the waves, or successions of waves, of light that may originate in ever so small a portion of a luminous body in a second of time; but the period of the longest of them is known to be so short that they may be thousands of billions, without even two starting together; yet suppose as many as we please to be contemporaneous, however they might interfere with each other, the very manner of their interference ensures that in the whole there can be no loss of force in any wave, and therefore no loss of light. At particular points interference may destroy light, but then it will increase the intensity fourfold at other points, the whole effect remaining constant.

Perhaps the above slight attempt to explain a matter which is not in general very clearly stated in popular works, may lead some to regard with more respect a science which displays such marvellous perfection in the works of the Great Creator, and leads to such sublime considerations; a science whose evidences none can understand without a thorough conviction that every attempt to overthrow them must be futile.

With regard to the physiological considerations to which Mr. Thomas refers, I will only say that if Newton has satisfactorily shown that all the colours in nature are but compounds of the colours of the prismatic rays, and if Maxwell has satisfactorily shown that these prismatic colours are identical with the colours that may be produced by combinations of three of the prismatic rays, namely, those which excite the deepest sensations of red, green, and blue, then there is satisfactory reason to consider the sensations excited by those three rays as the nearest possible approach to three simple or elementary colour sensations, of which all possible colours are compounded. And if, according to modern custom, we use the term *primary colours* to mean simple or elementary colour sensations (in which sense it was used first, I believe, by the German astronomer Mayer, a century after Newton used it to denote the prismatic colours), then these three colours have a claim to be so called in preference to any others. To inquire in what manner those sensations are produced by the action of the various rays, may be interesting and useful, but is no more essential to the theory of colour, strictly so called, than is the inquiry into the nature of light. I myself incline to think that the optic nerve is so framed as to admit of three, and only three kinds of vibrations, and that these are severally excited with greater force by rays which more nearly accord with their several periods than by others. Some homogeneous rays, for instance, excite the sensation of red most powerfully, others that of green; while a third kind, of intermediate wave-period, excites both of these sensations equally at once, and thus produce the sensation of yellow.

This is no suggestion of mine, though the particular analogy, the possibility of which I have suggested in my book may be new. Aristotle himself, the first and best of the ancient observers of nature, whose writing have come down to us, had a similar idea about the relations of the principal colours; and Newton himself (whose most infelicitous conjectures are well worth our study, makes the following queries in his Optics (book iii.):—

"Do not the rays of light in falling upon the bottom of the eye, excite vibration in the *tunica retinæ*? which vibrations, being propagated along the solid fibres of the optic nerves into the brain, cause the sense of seeing. . . . . .

"Do not several sorts of rays make vibrations of several bignesses, which, according to their bignesses, excite sensations of several colours, much after the manner that the vibrations of air according to their several bignesses excite sensations of several sounds? And particularly do not the most refrangible rays excite the shortest vibrations for making a sensation of deep violet, the least refrangible the largest for making a sensation of deep red, and the several intermediate sorts of rays, vibrations of several intermediate bignesses to make sensations of the several intermediate colours?

"May not the harmony and discord of colours arise from the proportions of the vibrations propagated through the fibres of the optic nerves into the brain, as the harmony and discord of sounds arise from the proportions of the vibrations of the air? For some colours, when they be viewed together, are agreeable to one another, as those of gold and indigo, and others disagree."

Young, in his Lectures on Natural Philosophy, seems to have been the first to apply the notion to the theory of three simple sensations. I cannot but remark that had Newton's and Young's suggestions on this point been considered as they deserved to be, we should probably never have had so many fanciful and groundless analogies proposed between colours and musical notes, as may be met with in subsequent works.

With respect to ocular spectra, I hope Mr. Benson will carefully reconsider what I have written in the chapter on the ocular modifications of colour, and try the simple experiments there mentioned, without any undue excitement of the eye, and with strict adherence to the cautions mentioned. I shall be disappointed if he does not find out that the doctrine I have laid down is correct. Having examined many memoirs on the subject, I am surprised that he considers it not in accordance with the "more advanced physiological explanations," and should be glad to be informed where these may be found. But he misunderstands my doctrine when he says "the insensibility of the eye to one colour, according to Mr. Benson and some former writers upon this subject, is clearly, according to their own showing, a keen sensibility to another." I only show that the excitement of any one of the simple colour-sensations tends to deaden for a time the sensibility of the eye for the same, leaving its sensibility for the others unimpaired.

Before concluding this already too long a reply, I must gently protest against what seems (but I am sure is not intended to be) a somewhat disingenuous attempt to fasten upon me the absurd notion that colour has objective existence, though my treatise begins by declaring "Colours are merely sensations produced by the action of light on the nervous tissue of the retina." When I say (in a sentence imperfectly quoted by Mr. Thomas) "The colours of all natural objects are merely the sensations produced by those of the incident rays which they send to the eye," my expressions certainly admit of improvement, but their sense is obvious,—*produced by such of the incident rays as the object sends to the eye:* and not, *produced by the colours of the incident rays.* To find fault with such terms as "white light," "colours of lights," seems rather hypercritical when the meaning is plain, and both whiteness and all other colours are treated throughout as sensations alone. I thought I had said enough on this point in my letter of September 26th. We cannot always use an awkward periphrasis, such as "light exciting the sensation of white," or "a green-producing ray." But Mr. Thomas, I think, commits a much more serious fault when he defines light as a sensation only, ignoring the universal and principal use of the term to express that which proceeds from the luminous object and produces the sensation; and especially when he words his definition so as to make a distinction between light as a sensation and the sensations of colours, as if there could possibly be any sensation of colours which is not light. For in this sense "light" is a mere generic term, including all possible sensations of colours.

W. Benson.

ON WRITING-DESKS.

There is a piece of furniture which is gradually becoming extinct; and which may be looked for in vain at Mechi's, Parkin & Gotto's, or any other fashionable purveyors of writing materials; it is the large, plain, heavy, old-fashioned *writing-desk*, at which our grand-parents used to sit, with a business-like, and often gloomy countenance, so inexplicable to the young, whose cheerfulness seemed to receive a sudden check from the time that desk was opened, till the sound of the little click announced the key at length turned upon its mysterious contents!

What could those odious desks contain to occasion such long and serious faces? the deep thought, the frequent writing, the search amongst letters and memorandum-books—old, old papers—little packets unfolded, and again carefully replaced. It makes one shudder to recall those times, which passed as a cloud, more or less dense, over the sunny brow of hopeful youth! Years have, however, revealed to us the secret, and we find ourselves growing old, with writing-desks, which, notwithstanding their pearl, brass, or ivory dressings, wring from us every sentiment of pleasure and pain to which the heart of man is heir! Yes; we, too, now have desks, and will speak out that they inclose, and hold in a solid form, each transient joy and poignant grief of our lives, of which the outward world has, in comparison, witnessed but the passing shadow. In them lie concealed—yet ready to be brought before us at any moment—all the emotions that ever disturbed the heart or pleased the imagination. Treasured up within their narrow limits, hallowed reminiscences are packed side by side with angry words, cold rebukes, claims of money, sympathy, or love! What a medley! Truly, O Desk, thou remindest one of the human heart itself! To ransack thy stores is to lay open the secret recesses of that vital spring whereby we may trace the character and past life of thy owner! No wonder thou art kept locked! No one likes his inward soul to be invaded, the sanctified precincts of thought, words, and works to be entered by other than one's own self! The older we become the more tenacious are we of such infringements, and the more have we to stow away in those silent nooks.

But although the desks of our forefathers are gradually passing away, some to lumber-rooms, others to second-hand furniture shops, and the like, their descendants are numerous, elegant, and often costly in appearance; one can scarcely believe they contain aught but the most charming subjects for contemplation.

Children, too, in these days have their desks, and how simple and childlike are the contents! Their pure and unsophisticated minds are surely reflected in their little desks, the interior of which, in the genuineness of their nature, they display with such delightful frankness. Smooth and spotless as the bordered white paper they hand you to admire, is the dawn of those impressions which, coming in contact with this frail world, need so much skilful guiding,—bright and sweet as the little gilded scent-packet which accompanies the paper, imparting its fragrance to all around, are the hope and spirit which pervade that developing mind! In one corner may be seen the silkworm's golden skein, occupying a place that in after years we find devoted to some loved look! An intricate puzzle next turns up! *To us* does it not portend difficulties to be encountered? While the paper-flower, concealing riddles within each leaf, speaks of hidden problems yet to be unravelled, the gay pen-wiper with its coronet of beads, almost too smart for use, dare it but admonish, would say,—"Use me o'er the pen has defaced the fair sheet with discord, and remember that kind words echo kind feelings."

All these, and many more, simple, yet to the contemplative mind, soul-stirring objects, are to be found in the child's desk; objects in which young eyes merely see an outward beauty, but into which the thoughtful penetrate, and behold the shadowy future.

The age of "*teens*" has, generally speaking, *no desk*; its substitute is the gay paper-case, iridescent with flowers of mother-o'-pearl: if there be an unsettled and doubtful period of our lives, it is surely during those years from twelve to twenty, though it is then one looks around and beholds nothing but varying colours of brightness, warmed with life's meridian sun, our real mission lying in the grey undiscernible distance. True to the age is this gay, and in some measure, useful receptacle,—the paper-case. Open it, and the interior corresponds. What have we? Various coloured papers; scraps of poetry in German, French, and English; half-finished notes (of course we will not read *them*); "card of dances" at last ball; concert programmes: not that the owner is without many little treasures besides, but these are scattered in jewel-cases, glove-boxes, drawers. None, however, are in the paper-case. No concentration of feeling has yet taken place; time and circumstances alone bring that; and in doing so impart accordingly, strength and firmness to the character.

It is after twenty that the first films of thought gather; these become united by thread-like intersections, which afterwards swell into channels through which a more or less healthy circulation deposits, as it flows, those needful resources which constitute the marked difference observable between one individual and another.

From that time those various accumulations unite, by slow degrees, till at length they *swarm*, and become, by some means or other, *lived*, in that presence-chamber of our souls,—the desk! And

ANCIENT TABLES IN THE RATHHAUS, OCHSENFURTH, BAVARIA.

who can look over its contents free from excitement? Who can repress the strong feelings which rise or fall with the touch of every fresh packet? The vilest heart occasionally shudders at what it there encounters; for the writing-desk, though it be the hiding-place of many foul deeds, keeps no secrets when opened. The base transactions of the swindler stare him in the face, and sinners look up therein traces of their own guilt! But, let us leave the contemplation of human nature in this its worst form; many a sweet souvenir draws us, like an overpowering magnet, into communion with our own desks; and although, while diving into the past, we may inadvertently open a partially-healed wound, close by will be found that remedial balm, the solace of friends, which, in their own handwriting, assures us of their sympathy and love! Not far from this source of comfort lie the rich auburn—the black—ah! and the grey curl—all that remains of dear ones that are gone! On these we like occasionally to look; and, allowing our thoughts full freedom, they fly swiftly over years that are past; halting only here and there at those prominent events which must for ever stand out in bold relief upon the chequered pages of our lives!

It is to the writing-desk that we consign our first small earnings, until necessity, or a more profitable investment calls them forth. In that desk, too, will be found our last wishes, when we have no longer breath to give them utterance. At her writing-desk the careful housewife sits, pondering how to make "both ends meet;" and often by the midnight lamp may be found the speculative man, leaning over *his*, and reckoning profits which are, perhaps, at that very moment wrecked at sea. Who will, after such considerations, look with indifference on writing-desks? Those we have noted, and many other examples of feeling, varied as individuals' minds, find a resting-place in those lone receptacles of the heart. Whenever we are called away, survivors! respect their contents, for they represent the spiritual part of our nature, which too frequently passes through this life misjudged and misunderstood. Touch the long-treasured relics they contain with reverence, and on committing them to the flames, which must, sooner or later, be done, let it be with solemn thoughts and careful hands, for perhaps the spirit of the departed hovers over them! Mrs. C. H. S.

ANCIENT FURNITURE IN THE RATHHAUS, OCHSENFURTH.

Some short time ago we gave a view and details of an interesting earthenware stove in the Rathhaus at Ochsenfurth, near Wurzburg.* Our present illustrations represent two very curious old tables in the council chamber of the same building. No. 1 is made to open, and the upper portion forms a receptacle for documents. This table has been barbarously "grained" in imitation of oak; the wood of which it is constructed is a very fine pine.

No. 2 is a still more remarkable example: like the former, it is of pine, but retains its old colour and decoration. The hollows are painted crimson with black spots. The chamfers are gilded. The slab of this table is ornamented with a "zigzag" pattern forming a border of inlaid wood. There are no less than eight other ancient tables in the same building, but the two we have illustrated are the most noticeable. The date of these interesting examples of ancient furniture is unknown, but from the style of the carving and mouldings there can be little doubt that they are works of the latter part of the fifteenth century.

* See pp. 450, 451, *ante*.

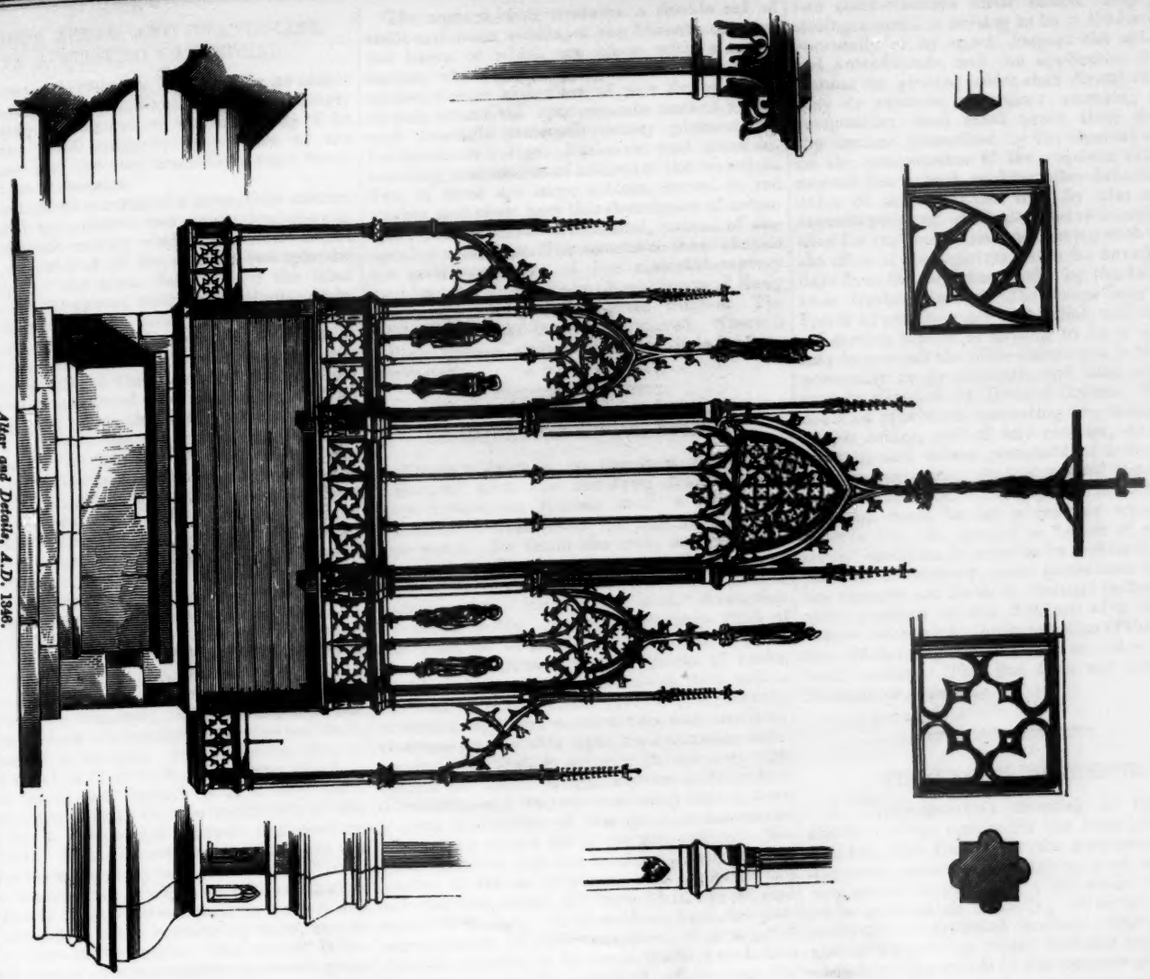
REFERENCES.

Fig. 1.

A. Termination of cusp of trestle.
B. Screw-head.
C. Side view of ditto.
D. Hinge.
E. Moulding under the slab.

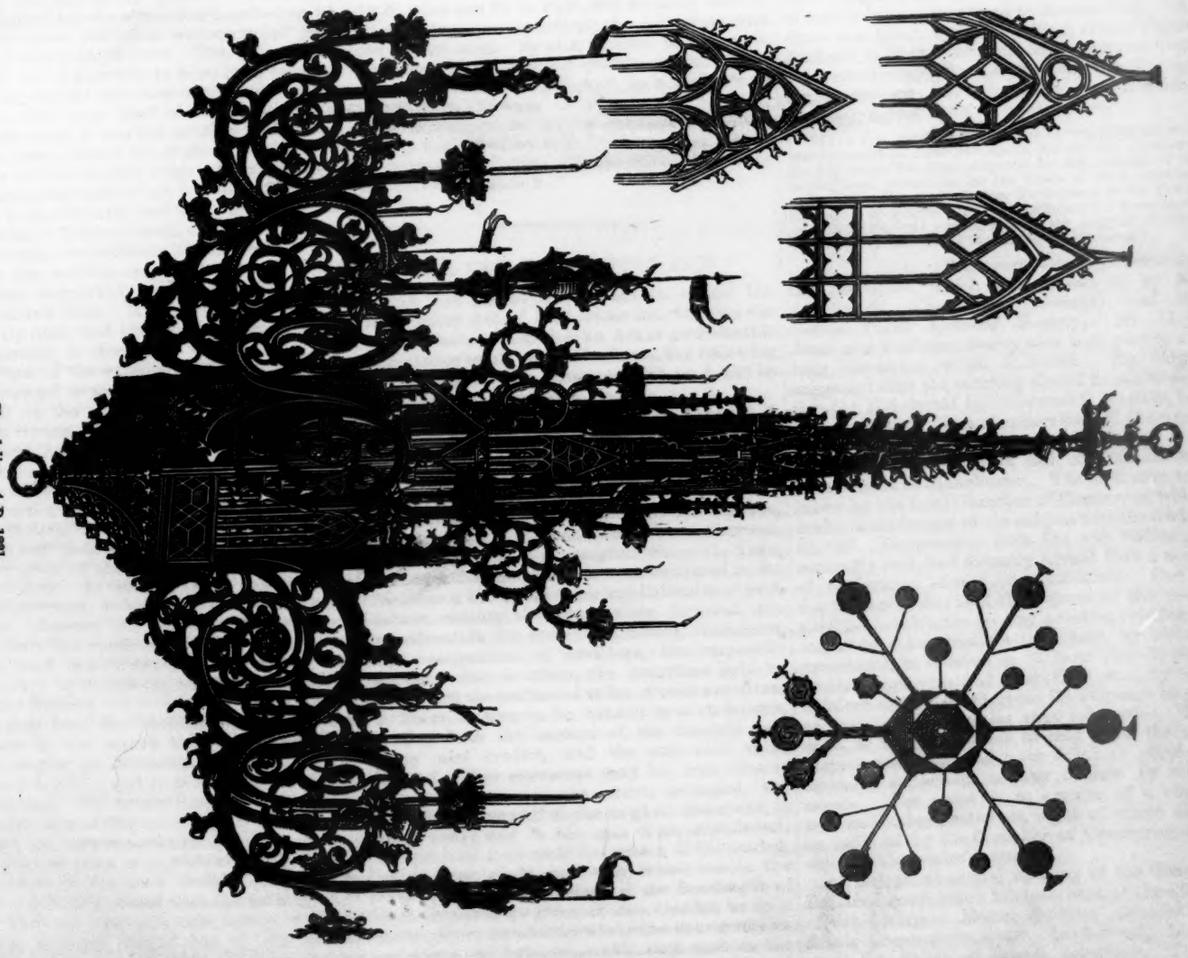
Fig. 2.

F. Termination of cusp to trestle (half full size).
G. Moulding of leg of trestle (under side).
H. „ „ (upper side).



Altar and Details, A.D. 1346.

MEDIÆVAL BRONZE ALTAR AND CHANDELIER IN AUGSBURG CATHEDRAL.



Chandelier, A.D. 1331.

BRONZE ALTAR AND CHANDELIER IN AUGSBURG CATHEDRAL.

Augsburg Cathedral, although by no means a magnificent or grand building, is exceedingly interesting on account of the singularity of its plan, the great antiquity of portions of the structure, and the very beautiful ancient furniture which it contains.

The cathedral consists of a large, lofty eastern choir, with apse, chevet, and surrounding chapels, all fourteenth-century work. The aisles of this choir are entered at the sides by two splendid doorways of the same date. Were the other portions of the church built upon a similar scale, with their choir and aisles, it would be one of the finest cathedrals in Germany; and it is highly probable that those who designed this choir contemplated the rebuilding of the whole church upon a scale of equal magnificence. The architect may regret that this scheme was never carried out, but the antiquary will be most thankful for its failure. West of the choir are two square Romanesque towers of moderate height, crowned with tall lead spires. These towers are placed so wide apart that the nave and aisles intervene between them. The effect of this arrangement is singularly ugly, and is not improved by the roof of the choir being higher than the towers themselves. The nave is very early Romanesque work, with double aisles of the fourteenth century. It is so low that the chancel arch is only as high as the aisles of the choir. The vaulting is fifteenth-century work, but very bold and good. Westward of the nave and aisles are two transepts, the same height as the nave, and these are crowned by a western choir, terminating in an apse. Internally this choir is raised about 12 ft. or 15 ft. higher than the floor of the nave, and beneath it is a very early Romanesque crypt. On the south side of the nave is a Romanesque chapel, dedicated to St. Blaize. The cloisters on the south side are late fourteenth-century work.

The bronze altar, of which we give an illustration, stands in the western choir in such a way that the priest, when celebrating mass, stands with his face to the people. The reredos is entirely in bronze; the constructive portions appear to be cast, and the ornamental ones beaten. The height to the top of the crucifix is about 35 ft. It is probable that the space now boarded up immediately above the altar was occupied by a retable of costly metal work. The three centre spaces do not appear ever to have been occupied by statues, but the two outer ones were certainly filled up with some kind of ornament, as the rivets into which it was fastened are still visible. The four lower statues are of wood, gilt, and are probably not the original ones. The date of this most interesting work of art is 1346. This altar is about to be restored, and the portions which are wanting will be replaced.

In the apse, immediately to the west of this altar, is the ancient episcopal throne. It is a stone seat supported upon the backs of two rudely-carved lions. It is evidently a work of very early date, and the little ornament used is quite classical in character. It is far older than any portion of the existing cathedral, and may have belonged to some earlier church. Against the wall, to the north of this altar, is another bishop's throne. It is of Early Romanesque work, and has a curious canopy over it supported upon pillars with ornamented shafts. Its date is 994. Westward of this altar and throne are a fine double set of stalls, richly carved, in *deal*. They are the work of the fifteenth century, and their good state of preservation is a strong proof of the durability of this wood for internal work. At the east end of this choir is a low metal screen. It is the work of the sixteenth century. Against the pillars of the nave are eight altars, the reredoses of which are new, but contain most remarkable ancient pictures; four of these are by Zeitbloom, and the other four by the elder Holbein.

Hanging from the vaulting in the centre of the nave is the superb bronze chandelier, of which we give an illustration. The date of this fine work is 1321; and it is in a perfect state of preservation. The bronze doors to the porch on the north side of the nave date from the year 994, and are very remarkable (we have given a description of them in another number). Six of the windows of the nave contain stained glass, which is probably cœval with the building A.D. 990. They represent very rude figures, which, in drawing, strongly remind one of the Bayeux tapestry. They are probably the very earliest stained glass in existence.

The eastern choir contains a double set of stalls and stone sedilia, of the fifteenth century, the backs of which are hung with stamped leather, which has a very agreeable effect; and a modern Gothic high altar, of poor design. The chapels round the apse contain ancient altars, with beautiful sixteenth-century pictures, by Zeitbloom and Hans Burkmair, and some interesting monuments of bishops of the cathedral. Two of these are large tablets, carved in red marble, and show how this description of monument can be made ornamental, instead of disfiguring a building. The screens to these chapels are good specimens of late sixteenth-century metal-work. In the Lady Chapel is a good Early fourteenth-century stained-glass window. The whole church has been well restored. There is a little modern stained glass, but it is far from meritorious.

EXPLORATION OF PALESTINE.

Wilson's Arch is on the west side of the "Haram" area, near the Jews' Wailing-place. Here Lieutenant Warren sank a shaft last November, "to see what the wall was like" at that place. He found the rock, and the base course of the Haram wall let into the rock at a depth of 50 ft.; he discovered, also, a stream of water running "through the land," down this Tyropœan valley. Later, on January 22nd of this year, he wrote,—"We have made a great discovery this week, viz., a system of tanks, vaults, and aqueducts, in connexion with, and to the west of, Wilson's Arch: they are, apparently, of similar age and construction, and are likely to throw considerable light on Jerusalem topography. In fact, it appears to me that this system of vaults is the key to underground Jerusalem; and we may reasonably hope to have a good knowledge of the great embankment which runs across the Tyropœan valley." We have before us, just now received, a plan of these vaults, as far as they have been explored. In one row, the vaults are each 12 ft. square, and about 18 ft. high. It is evident, from the passages broken off and unexplored, that a great deal yet remains to be investigated here before the question can be answered,—What was the use of these vaults? The passage, which is 12 ft. wide and 14 ft. high, was probably used as a secret passage connecting the Jaffa Gate with the Haram area. By this, in case of a tumult, troops could be brought quickly and unexpectedly. It has been followed to a distance of 250 ft. from the wall.

We would remind our readers that the fund is wholly supported by subscriptions; that money is wanted; and that the society's office is at 9, Pall-mall East.

THE NEW BANKRUPTCY ACT.

The Act passed last session to amend the Bankruptcy Act of 1861, came into force on the 11th instant, and as it is an Act of considerable importance to all men of business, the following abstract in popular language will no doubt be acceptable to our readers.

The Act provides that no deed between a debtor and his creditors, or any of them, relating to his debts and his release therefrom, or to the distribution, inspection, management, and winding up of his estate, shall be as binding on all the creditors as if they were parties thereto, unless, in addition to conditions hitherto observed, the following be also complied with:—1. Together with the deed there is to be delivered to the registrar a list of the debts and liabilities of such debtor, stating the times when incurred, the consideration for same; the names, residences, and occupations of creditors, the respective amounts due to them, the securities held by them, and the estimated value of such securities. 2. There is also to be handed in a statement, setting forth the amount of the debtor's property and credits, and the estimated value thereof. This statement may be, from time to time, by leave of the court, amended, the amendment, as well as the original statement, to be on oath; and in the case of an amendment, the affidavit is to state the reason of the amendment being made, and why it was not in the original statement. Notice of the handing in of such lists is to be given in the *Gazette*, or in a daily paper, circulating where the debtor resides or carries on business, within such time as the general orders made by the Lord Chancellor and two commissioners shall direct. Any person stating himself in writing to be a creditor, may personally or by agent, inspect the statement and amendments, and (on application in such manner as general orders shall direct) obtain a copy or extracts. Creditors assenting to the composition deed must prove their debt in the manner prescribed by the General Orders. In the computation of the requisite value, the amount due to each creditor, after deducting the value of the securities held by him on the debtor's property, shall alone be reckoned. The time for the production and leaving such deed at the office of the registrar, is to be twenty-eight days from the day of execution by the debtor, or such further time as the court may allow. Proofs by creditors are to be filed, and any person stating himself in writing to be a creditor, may inspect all the office documents in the case, personally or by attorney, and have copies, in manner directed by General Orders. The Act contains provisions respecting the examination of the debtor, and of any creditor, or alleged creditor, and others possessed of information; and also respecting the payment of the costs of such examination. The application for the examination must be by a creditor whose debt exceeds 10*l*. In case of a "deed of arrangement," creditors, in order to be reckoned in computation of majority, must prove their debts in the manner set forth in General Orders. The other portions of the Act are of a technical nature, referring to the jurisdiction of the respective Bankruptcy Courts, and to other strictly legal matters. The Act does not extend to Scotland or Ireland.

THE TRADES MOVEMENT.

A representative meeting of the trade societies of the metropolis has been held at the Bell Inn, Old Bailey, for the purpose of adopting such measures and taking such action as may secure the passing of a Bill which will place trade societies on a footing of social equality with other associated bodies. The circular calling the meeting stated that this had become necessary "by reason of the insecure position in which the recent conflicting decisions of judges have placed trade societies." A large number of trades were represented at the meeting. The chair was taken by Mr. Spelling, of the Vellum Binders' Society. Among those present were Professor Beasley, Mr. Lloyd Jones, Mr. Crompton (barrister), &c. Mr. Guile (Ironfounders' Society), moved the first resolution,—

"That this meeting, composed of representatives of various societies in the metropolis, having fully considered the Bill which has been prepared for the purpose of obtaining legal protection for the funds of trade societies, and which was brought before Parliament by Sir Fowell Buxton, is of opinion that it is sufficient for every legitimate purpose, and should receive the support of every well-meaning member of the House of Commons."

Mr. W. Allen (Engineers' Society), seconded the resolution, which was spoken to by Mr. Applegarth (Carpenters' Society), and Mr. George Potter (Joiners' Society). Mr. Lloyd Jones and Professor Beasley also took part in the long discussion which followed. Mr. Odger suggested that the meeting should be adjourned, that the Bill should be improved if possible, but not abandoned. The consideration of the question was then adjourned.

A court of arbitration and conciliation has been formed in Manchester. The first step was taken by the local Chamber of Commerce, which invited a conference on the subject with the trades' council. Deputations from the two bodies accordingly met, and formally agreed that a court of arbitration should be established. One of the rules provides that the objects of the court shall be to arbitrate on any question relating to wages or other matters that may, by mutual agreement, be referred to it from time to time by the employers and operatives, and, by conciliatory means, to interpose its influence to put an end to any disputes that may arise. The court is to be appealed to only when the employers and employed have failed to effect an amicable settlement of any dispute by other means. The court is to consist of a chairman and sixteen members, eight of whom shall be selected by the Chamber of Commerce, and eight by the trades' council.

An adjourned annual meeting of the General Builders' Association has been held, at the offices of the Liverpool Master Builders' Association, South Crescent-chambers, Lord-street, Liverpool, Mr. Baker, of Bristol, presiding. There

was a large attendance of members from Birmingham, Manchester, Stockport, Chester, Bath, Coventry, Leeds, Bradford, and about twenty other of the principal towns in the kingdom. Some routine business having been transacted, a long discussion took place on a resolution, that notice be given to the operatives that the following rules will come into operation on the 1st of May next:—"That wages in all branches of the building trade be paid by the hour;" "That all rules restricting machine or quarry worked stone be rescinded in all towns where they are now in force;" "That all disputes respecting wages or working rules be settled by arbitration." An amendment, that the debate be postponed for twelve months was proposed, but it was subsequently withdrawn, and the resolution was carried unanimously.

A very full meeting of the Bristol operative carpenters and joiners has been held, to consider their hours of work and wages. The first resolution adopted declared that the trade had long felt the necessity of having a legitimate half-holiday on Saturday, by leaving at twelve instead of two o'clock, and pledged the meeting to do all they could to secure so desirable an end. A second resolution contained a respectful request to the employers to make an advance of a halfpenny per hour on the present rate of wages (6d.), in order to bring the week's wages as near as possible to the present amount. It was decided to give the masters notice that the men would expect the increase to come into operation the first Saturday in May next. The chief reasons urged for the demand thus resolved on, according to the local *Times*, are that the members of the same trades in other towns, where the rent is cheaper and provisions are not dearer, get more money and work fewer hours than those in Bristol.

BUILDING OPERATIONS AND SANITARY IMPROVEMENTS IN BARNSLEY AND THE DISTRICT.

The improved appearance of the town of Barnsley within the last few years, where perhaps building operations have been carried on as extensively as in almost any West Riding town, is very marked indeed. The numerous new collieries and iron works in the district have caused the building trade to be brisk, whilst the new Midland Extension from Cudworth to Barnsley has found ready work for a large number of hands. Barnsley possesses few good public buildings; but this will, no doubt, be altered, should a charter of incorporation, for which it is seeking, be granted. The want of builders has chiefly been in the erection of cottage property, for which there is yet great demand. The number of houses in the town in 1860 was 2,889; whilst in 1861 it was 3,568, being an increase of 679. Since that time new streets almost without number have been erected both at the west and south ends of the town. The operations are being further extended. At the last monthly meeting of the Board of Health, which is the governing body, upwards of thirty building plans were presented to the Board for approval, whilst at the previous meeting of the same body not fewer than fifty plans were approved. With regard to the sanitary improvement of the town, something has been done. A new sewerage scheme has been provided and carried out to a great extent. The Board of Health are, however, still wishful to provide for the wants of the public, and at their last monthly meeting they signed and sealed a contract for a new sewer on the Cockerham-road, which is about to be constructed by Mr. Henry Carter, of Barnsley. It may also be mentioned that something approaching 70,000l. has been spent in providing a supply of water from a scheme propounded by Mr. Hawksley, from the Yorkshire moors. At Ingbirchworth, a place about seven miles from the town, the works are scarcely yet completed; but the water has been supplied to the inhabitants for a few months, and, during the past trying season, has not been found to be wanting. In addition to these improvements, which have provided much labour for those connected with the building trade, there are several rather important enlargements about to be made. Plans have been prepared by Mr. Wade, and are now before the Poor-law Board in London, for the erection of two additional wings to the workhouse, which was erected in 1851 from designs prepared by Messrs. Lockwood & Mawson, of Bradford, at a cost of 5,000l. A new wing is also about to be added to the present Beckett Dispensary, which has been built and presented for the benefit of the town by Mr. F. J. Beckett, of Torquay. The new addition is to provide an infirmary or accident ward for the reception of the numerous accidents which are constantly occurring in the district collieries and works. The changes brought about by the extension of the new line into the town will necessitate the erection of a new county court, the present one being required in the extension, so that there is every prospect that builders will find plenty of employment in the town and district for some time to come.

THE HOUSES OF THE POOR AT THE WEST END.

The thirty-fifth section of the Sanitary Act of 1866 having, with the sanction of the Secretary of State for the Home Department, been adopted in the parish of St. James, Westminster, for the purpose of regulating houses let in lodgings, Dr. Lankester, medical officer of health, proceeded to ascertain the number of notices to be served on persons for lightening the pressure of the population on the existing lodging space. He commenced with twenty-five houses in Heddon-street (Regent-street), Rupert-street, and Tyler's-court. In these twenty-five houses he found 549 persons living; whereas under the regulations of the Act the houses would only accommodate 198 persons, showing that 350 persons would in these twenty-five houses alone have to be turned into the streets. Carrying his investigations further, he estimates that there are 500 other houses in the parish equally overcrowded, and that at least 7,000 persons must be removed from their homes to carry out the regulations. If these 7,000 persons had been for the sake of their health compelled to get rooms somewhere else they would have been obliged to leave the parish and go to the surrounding parishes, or to the suburban districts, where it would have been impossible for them to carry on their occupations. Dr. Lankester states that he sees no remedy for this state of things but the erection of dwelling-places, adapted for the working-classes to live in, in the districts where labour is required. There are many spots in the parish where such lodging-houses might be eligibly built. Nearly every court in the parish is overcrowded, and a gigantic nuisance, injurious to health. In the construction of such lodging-houses, the wretched domiciles which now minister to the poor, the indolent, the vicious, and the criminal classes, would be abolished.

OPENING OF TURKISH BATHS IN BRIGHTON.

The directors of the Brighton Turkish Bath Company (Limited) have opened their new buildings in West-street. The foundation-stone of the building was laid on the 2nd of last March. The contractors were Messrs. Cheesman & Freeman, of Brighton. The architects were Messrs. Goulty & Gibbins. The style is of an Oriental or Moresque character, even on the exterior. The height of the building is 56 ft., and it has 50 ft. of frontage. Its depth from front to back is 120 ft. The gentlemen's bath is entered from the upper, or north, side of the frontage, through a waiting-room, 13 ft. by 21 ft., and an ante-chamber. The "cool-room is a large, nearly square, Alhambraic hall, 47 ft. long and 45 ft. high. There is a miniature fountain close to the entrance. A polished and deeply-stained flooring skirts the apartment and encloses shining and rich coloured tiles for the inner part. A marble bath, 35 ft. long, 5 ft. wide, and 5 ft. deep, bordered with exotic plants, leads up to a Moresque triple arch, one section of which is closed by lace curtains and the side arches by heavy red curtains. There are "divans" round the room, curtained and cushioned and pillowed in damask and silk of varied hues. In a gallery above, similar drapery and curtains show "divans" there also. The high and steep-pitched roof overhead has beams, rafters, and pillars of Moorish design.

The triple arch leads into the "hot room." This chamber, about 30 ft. in diameter, is floored entirely with white veined marble. There are four recesses off the room; two of which are used as hot rooms in aid of the central chamber; the other two being used respectively as a lavatory and a douche room. The large hot room is kept at a temperature of from 115 to 120 degrees; one of the recesses is at about 150 degrees; the other can be heated to 180 degrees. The recesses are fitted with marble slabs, by way of couches, covered with felt and having pillows and cushions. The hot air comes in from the furnaces under the building through perforated zinc.

In the gallery (13 ft. in height to the roof) are three private baths with divans and hot rooms.

The Ladies' Baths are on the first floor, and are approached by a separate entrance on the south side of the frontage. There are four hot-rooms, each 9 ft. by 10 ft. 6 in.; two cool-rooms, about the same size, and one large cool-room, 27 ft. 6 in., by 14 ft. 5 in. The waiting-room for the ladies' bath is on the ground-floor. In the back part of the upper story of the building is a laundry, with drying-rooms, &c., attached. There are also rooms for the shampooers and attendants. The cool-rooms were decorated by Mr. T. Dury, who has furnished the stained glass and will complete the decorations. The heating was executed by Messrs. Jeakes & Co., of London. Mr. Parker has acted as clerk of the works during the construction of the building.

CHURCH OF ALL SAINTS, LITTLE MUNDEN, HERTS.

On Thursday, the 8th inst., the parish church of All Saints, Little Munden, was re-opened for public worship, after being repaired and re-instated. The manor, of which this is the parish church, is very ancient. Domesday Book mentions the name of a vassal of Earl Harold, to whom it belonged in Saxon times; and how William the Conqueror afterwards disposed of it. The church belongs chiefly to the beginning of the fifteenth century. It contains some remarkable canopied monuments with sculptured effigies. In July of last year a circular was issued by the rector, the Rev. F. A. L. Foster, in which the state of the church was described in the following words:—"The whole of the fabric has fallen into a bad state; the walls require re-facing; the stonework generally needs repair or restoration; the woodwork of the roofs has been disfigured by alterations, and is much decayed; drainage and paving must be attended to; there should be new seating throughout, and means must be provided to warm the church, at present so damp and cold as to be scarcely endurable in winter." Through the strenuous exertions of the rector and parishioners, the programme of restoration, as traced in the circular quoted, has been carried out. The church consists of a west tower, nave, north aisle, a north chapel, and chancel; but there was doubtless a much earlier church on the same spot. Some vestiges of this are observable at the north-west corner of the building, and have been carefully preserved. The walls, which are of flint, with freestone dressings, have been refaced; and the windows restored.

The coarse modern porches have been removed, and two new ones erected at the north and south entrances, constructed of the same materials as the main body of the building, and in accordance with its style of architecture. A stone groined vault, of which only indications remained, has been put in at the western entrance through the tower. This ought really to be the chief entrance to the church; but it is at present obstructed by a large raised pew, resembling an organ-loft, just over the door. This is private property, but it is to be hoped that its owner will be persuaded to consent to the removal of so unsightly an obstruction. The interior of the church and the porches has been paved with tiles. New open seats, of stained deal, have been substituted for the old pews, except in the north chapel and the chancel, where such of the old seats as could be used have been worked in. The pulpit and reading-desk are carved in oak. There is to be a new reredos. The roof of the nave (one of the Hertfordshire king-post kind) is open, showing the rafters. The drainage has been attended to, and the interior is warmed by hot-water pipes. At the south-east angle of the church a vestry has been erected, the want of which has caused some inconvenience hitherto. The path through the churchyard leading to the north entrance, which was five steps above the floor of the church, has been lowered and levelled. The architects of the works were Messrs. G. & H. Godwin, of Brompton. Mr.

Ginn, of Puckeridge, was the builder; and Mr. Leigh clerk of the works.

The tower had been left undone for want of funds; but on the occasion of the opening, the lay-patron, Lieut.-Colonel Loyd, who had already subscribed handsomely to the works, undertook the cost of bringing the tower into the same sound condition as the church.

REREDOS, HEMPTON, DIOCESE OF NORWICH.

A NEW reredos has just been completed in Trinity Church, in this parish, and dedicated to the glory of God, in memory of deceased communicants. It occupies the entire east end of the chancel, from north to south, and is divided into three compartments, the central part higher than the two sides, and rising up to a point. The central space is occupied by a cross, in green and red marbles, on alabaster, executed by Messrs. Field & Co., of Westminster, and it is flanked by two panels in Minton's majolica tiles, embodying the passion-flower and the Agnus Dei. The whole of this part rests on a retable of stone, inscribed, "By thy cross and passion, good Lord, deliver us," whilst the monumental inscription is placed behind the altar. The whole has been executed from the designs of Mr. C. J. Moxon, architect, London.

BIRMINGHAM NOTES.

THE London builders are sending fair orders into this district for tools and material. Mr. Milward, successor to Allarton & Powell, the well-known awl-blade makers of Birmingham, is cautioning the public against an improper use which is being made of the name of the firm by a late manager in their employ. The inquiries for stove-grates and register-grates are steadily maintained, and door-knockers command a tolerable request. The difficulty among builders and ironmongers often experienced in regard to the "hand" of locks required for doors, is being effectually remedied by Messrs. Carpenter & Co., of Willenhall, who have recently introduced a number of new patterns of their double-handed rim and mortise locks, adapted for doors opening either to the right or left. The wrought nail makers in East Worcestershire have a better demand in the leading branches, and the men are getting better wages for their work. The awl-blade makers at Bloxwich are better employed both for home and export. In the bolt trade, the manufacturers in South Staffordshire are introducing machinery on a more extensive scale, and thereby reducing the cost of production. The price both of "tower" and "barrel" bolts is proportionately lower. The Brassmasters' Association, at the recent quarterly meeting, decided that the price of brass should remain unaltered during the next three months. English tin is higher. Ornamental fences, gates, and palisades, both in wrought and cast iron, are in more request for home and Continental trade.

THE ATLANTIC CABLES.

THE manufacture of a new Atlantic telegraph, which is to be submerged between Brest, on the French coast, and a suitable terminus on the shores of the State of New York, is progressing satisfactorily. The new cable is almost identical in construction with those which were completed in 1866, the only difference being that the diameter of the conducting copper core is slightly greater, and the outside wires are of homogeneous Bessemer steel, galvanized, having a breaking strain of about 1,000 lb.; while the wires outside the existing Atlantic lines have a breaking strain of only about 800 lb. The new cable will be laid in two lengths,—one from Brest to St. Pierre, off the south coast of Newfoundland, in deep sea, of 2,325 miles, not including slack; and the other from St. Pierre to the terminus, of 722 miles in length, not including slack. The latter section will be similar to the Persian Gulf cable, as it will have to be laid in comparatively shallow water, and its exterior wires will be protected with Bright & Clark's patent silicious compound, which consists principally of powdered flint and pitch. The construction of the shore ends will be similar to that of the existing Atlantic lines, and will gradually become thinner until they assume the deep-sea dimensions. During the summer Her Majesty's ship *Gannet* took soundings along the proposed route. In order to avoid the dangers of injury from rocks and icebergs, the new line will be laid to the south of the present cables, below the southern edge of the Great Bank, so that it be in deep water. Sir James Anderson will command the *Great Eastern* during the expedition organized for the submergence of the line. The breaking strain of the new steel cable will be 7½ tons, and the strain required for submersion need not be more than 14 cwt. Even if at any time it be necessary to haul up any portion of it already laid, the strain need not exceed a ton and a half in the deepest water. The weight of copper forming the conductor of the existing Atlantic cables is 300 lb. per knot; in the new cable it will be about 400 lb. The *Great Eastern* has arrived at Sheerness, whence she will proceed with the cable probably in the end of next June.

We are glad to state that the Atlantic cable of 1866, which sustained some damage two or three months ago, has been repaired, and is again in working order.

THE DUBLIN WATER SUPPLY.

FOUL RESERVOIR BOTTOMS.

THE water supplied at great outlay to Dublin from the Roundwood-reservoir is pronounced undrinkable by the consumers. The Roundwood reservoir lies in a valley, one end of which is closed by an embankment, while the Vartry—a sufficiently pellucid stream—enters at the other. The bottom of the reservoir is composed in part of peat-bog, and hence, it is said, the impurity of the water. In process of time, no doubt, the peat in the Roundwood reservoir will either be washed thoroughly or rotted away, and then the water will become pure, but the process must be tedious, and for years the water supply of Dublin may be defective. Unfortunately, in the case of the Dublin Waterworks, washing cannot be effected. The Roundwood reservoir takes two years in filling, and to empty it now would be tantamount to postponing the supply of water to Dublin from the Vartry for at least a year. It is not easy to suggest any remedy other than the emptying and refilling of the reservoir. Water stained by percolation through peat cannot be purified by any filtering power which a great water company can be expected to employ. It is somewhat remarkable that engineers seldom pay the smallest attention to the character of the soil on which they propose to store up water, except in so far as its peculiarities are likely to affect the permanence of the storage embankment.

A physician, writing to one of the Dublin papers, suggests a reason for the impurity of the new supply which deserves attention here. He asserts that the valley of the Vartry was for many years thickly populated, and that the soil has been greatly contaminated by excreta and sewage matters which, now being dissolved out, render the water bad.

GENERALISATION IN ARCHITECTURAL EDUCATION.

THE article under this heading, in a recent number of our Journal, has called forth a rather melancholy and desponding letter from a correspondent who signs himself "Adelphi;" a letter which, however, we have no doubt expresses very much the feeling of many who have been decoyed into the profession by premium-hunting architects, and find, after the best years of their youth have been spent, that they have learned nothing satisfactorily, or that they do not possess the special talents which they discover, when too late, to be absolutely necessary for success in the profession. Many can sympathise with "Adelphi." Even those who were fortunate enough to be placed under a member of the profession who conscientiously endeavoured to do his best in instructing his pupils, must remember their own feelings of helplessness when, at the expiration of the articles, they began to consider what they really knew, and what capability they possessed for carrying out works on their own account. The answer to "Adelphi's" question, "Where are we to get the education we require?" we believe can only be, for the present, that a man must teach himself as well as he can. Details of construction may be learned during studentship, but all that appertains to the history and the principles of architecture, as an art, must be obtained for themselves from the study of published works, attendance at societies, and from thinking out the subject themselves.

There is one means, however, whereby the present apprenticeship system might be made to bring forth much better fruits than it does, or has hitherto done, viz., the more conscientious recognition by architects of their responsibility for the proper training of a pupil for whose education they have received a premium, and a greater degree of care and caution on the part of those who advise or induce a young man to commit himself to the study of so arduous and exacting a profession. What becomes of all the young men who go through their term of apprenticeship in architects' offices, and are then never heard of again? In nine cases out of ten, they have very likely been carelessly bound over by friends to a master who receives them as carelessly, without the slightest effort being made to explain to them the real bearings of the profession they are to undertake, or to ascertain whether they possess in any degree the natural ability for it, without which genuine success is out of the question. On this latter point, the architect who takes the pupil is the man most able, generally, to form a judgment; and it is not too much to say that any architect who, knowing what the profession requires, accepts as a pupil one who he is aware has no capability for it, without giving him or his parents a word of advice or caution on the subject, but quietly pocketing a premium and letting a lad's youth run to waste in copying drawings, such a man is guilty of a moral delinquency; he is carelessly permitting a fellow-creature to take a false step in life, which perhaps can never be wholly retrieved. This is surely an evil case; yet how common it is it would perhaps be well not to inquire too closely. If the remarks on architectural education, which occasioned the letter of "Adelphi," should have had the slightest influence in awakening to a more serious view of the subject either any who are entering the profession, or any of those who are undertaking the responsibility of acting as their professed and premiated teachers, they will have done good.

MASBRO' CEMETERY COMPETITION.

THERE were twelve competitors, and some of them sent in two or three designs each. The number was, according to pre-arrangement, first reduced to five, and then to three. The final choice fell upon the plans of Messrs. Blackmoor & Mitchell-Withers, of Rotherham and Sheffield. Next came those of Messrs. Swann & Hill, of Sheffield and Leeds, and those of Mr. Thomas Dobb, of Rotherham. It was accordingly unanimously resolved that the plans of Messrs. Blackmoor & Mitchell-Withers be adopted, and the work no doubt will be proceeded with. The two chapels,—the one for the use of the members of the Established Church, and the other for the use of Dissenters,—will be Early English in style. They will form separate buildings, as it is understood that the Archbishop of York objects to consecrate buildings of this character that are erected together with and, as it were, under the same roof as chapels for the use of other denominations.

THEATRES.

The Haymarket. — During the recess, Mr. Buckstone's popular theatre has been very agreeably decorated. Fresh painting and gilding to the public box-fronts, and hangings of green and gold to the private boxes, produce a bright and elegant effect. Above the proscenium is an allegorical group by Mr. E. C. Barnes. We happened to be ill-placed to judge of its merits, and may find another opportunity to do so more fairly. A new drop-scene, representing Tasso reciting his poems in Venice, has been painted by Messrs. Telbin. It displays their usual skill, but is over-red in colour, and might be improved by a little additional work in the right place. The re-appearance of Miss Bateman, in "Leah," seems likely to prove a great success, notwithstanding the length of time during which the piece was played in London some four years ago, an evidence of the number of audiences to be

found in the metropolis for any perfect work of its kind. The actress each night, in the special points of her performance, excites the spectators to the loudest demonstrations of satisfaction. A sister of Miss Bateman, under the name of Francis, made a pleasant impression, as she had previously done in Birmingham.

Royal Alfred Theatre.—Evidence was afforded on the opening night of this theatre in support of what we have before now said, that no quiet enjoyment can be expected in a house where any number of the audience are unable to see. This was the case in the gallery of the newly arranged theatre in Marylebone (we suppose it is by this time altered), and the result was a constant hubbub and the imminent risk of a serious accident. We do not hear of any architect having been consulted. The whole of the interior is new. Mr. S. Simpson was the builder employed. The ceiling, proscenium, and balcony front have been executed by Messrs. White & Co. in *carton pierre* and *papier mâché*. The coloured decorations have been carried out, discreetly, by Messrs. Green & King, and the general effect is light and elegant. The drop-scene, which represents the *Galatea* as she anchored in Port Jackson Harbour, is hard and heavy. On the other hand, some of the scenery in the Indian piece, with which the house opened, is creditable to Mr. Arthur Henderson. Miss Amy Sedgwick has the direction.

India.—It is stated that the Punjabees are going in with spirit for the erection of a theatre and concert-house at Anarkullee by a limited liability company with 100rs. shares. Eighteen shares have been already subscribed, and operations are to be commenced directly other eighteen shares are taken up.

THE GLASGOW INSTITUTE OF ARCHITECTS (INCORPORATED).

The first general meeting of the Glasgow Institute of Architects, which was incorporated on the 18th ult., under "The Companies Act, 1862," and "The Companies Act, 1867," was held in the Religious Institution Rooms, St. George's-place. Mr. James Salmon occupied the chair. After some preliminary business was transacted, the Council of Management for this year was chosen, consisting of Messrs. James Salmon, Alexander Thomson, John Burnet, George Bell, John Baird, James Boucher, John Carrick, Campbell Douglas, John Honeyman, jun., William Spence. It was unanimously agreed to recommend that the members of the Institute should use the initials I.A. after their signatures to documents connected with their profession, meaning thereby Incorporated Architect or Incorporation of Architects, to indicate membership.

A meeting of the Council of Management took place immediately after the general meeting of the Institute, at which Mr. James Salmon was elected president; Mr. John Burnet, vice-president; Mr. Wm. MacLean, writer, secretary; and Mr. Alexander Thomson, treasurer. A committee was appointed to frame a table of fees to regulate the charges for professional work done by the members, and by-laws and rules for the purpose of regulating and conducting the examination into the professional attainments and qualifications of entrants.

GAS.

At the usual meeting of the Metropolitan Board of Works Mr. Newton moved the following resolution:—

"That in the opinion of the Board it is expedient that the manufacture of gas should, as far as practicable, be removed from the populous districts of the metropolis; that the Board should promote a bill empowering them to supply gas to the metropolis; that if it be desirable to take the existing gas companies they should be compensated, the terms of such compensation to be, if possible, agreed on between the Board and the companies; and that the matter be referred to the special gas committee, with instructions to obtain the needful advice and take the necessary steps for the preparation of Parliamentary notices and of a bill to be introduced into Parliament during the next session; these powers, however, not to be sought if the companies will agree on such a price and such regulations as to the supply of gas as shall be satisfactory to Parliament."

Mr. Evans moved an amendment,—

"That in the opinion of the Board it is not advisable to take measures to promote a bill in Parliament in relation to gas supply during the ensuing session of Parliament."

After a long discussion the amendment of Mr. Evans was carried upon a division.

The Sheffield Gas Company have declared a dividend at the rate of ten per cent. for the last year at their annual meeting.

Bombay Cathedral is now lighted with gas. The sparrows that frequent the place found the burners very convenient to build their nests in, and when on the first two Sundays the gas was fully turned on, the materials composing these nests ignited, and there were, for a few minutes, three or four small conflagrations, that for a time looked dangerous, more especially as several sparks fell into the pews immediately under the burners.

At the half-yearly meeting of the shareholders of the Geelong Gas Company a dividend of 10 per cent. per annum was declared. The consulting engineer's report enumerated considerable improvements in plant and erection of masonry, and stated that the works were in a complete state of repair.

UTILIZATION OF WASTE STEAM IN WARMING BUILDINGS.

The steam from high-pressure engines is led into a self-acting apparatus, patented by Messrs. Herring & Co., of Chertsey, and is there condensed and utilised in warming the buildings, after which it is returned to the boiler still hot, and so pure, from its previous distillation into steam, that it can produce no incrustation in the boiler. Not only are the buildings connected with the steam power thus warmed, but 95 per cent. of the water is thus economised in its re-use, and fuel saved by the re-entrance of the water while still hot into the boiler. By this apparatus 20,000 cubic feet of mill or manufactory per horse-power, it is said, can be warmed, and six gallons of water per horse-power per hour saved, the water, as we have indicated, giving a hot feed, and without deposit; and all this continues to be done absolutely without any cost, the only outlay being the first cost of the apparatus, which seems to be safe as well as economical. The using up of waste heat has for many years received our attention, and we do not recollect of a finer example of such utilisation than this at least, in theory; and as for the practice, it seems that this invention has been tested, with great success, by the experience of the last two winter seasons.

UNDERGROUND ROOMS.

Sir,—Will you allow a plain country parson to enter his solemn protest against the cruelty of builders? Wherever I go I see great deep holes being dug, in which many of our poor unfortunate countrywomen are to be buried alive. Now, sir, it will be quite time enough to put us *underground* when we are dead; until then, pray let us do what we can to keep *above ground*. It may be difficult to do so in every case, but surely in the suburbs of London, and many other parts, there is no imperative necessity for sinking kitchens *in* the earth instead of placing them *on* the earth. Sunken kitchens are so prejudicial to health that few of us would think of placing a valuable horse in one of them. Ought we, then, to deem them suitable for our own species? But further, they entail a serious additional expense. The extra work occasioned by kitchen stairs is almost equal to half a servant. Without these stairs a servant could well-nigh do double the work. Then, again, the inconvenience and discomfort to the mistress of the house are great, and it is a terrible tax to her if she has to run up and down stairs every time she may wish to superintend some little matter in her kitchen. Health, economy, and comfort are all in favour of houses with kitchens at the back, on the same floor with the sitting-rooms. How houses constructed upon this plan are valued, appears from the fact that they are no sooner built than they are immediately taken; while those built upon the old-fashioned plan remain vacant for months, and in many instances for years. I have myself for some time been looking out for a small villa in the suburbs of London, with the kitchen at the back; but house-agents tell me that this style of house is rarely ever vacant,—that they could let any number of them if builders understood their own interests and would erect them. Yet the great majority of builders seem to persist in multiplying houses with the terrible drawback of a sunken kitchen; but I am persuaded that as the question of comfort and health is considered, so will sunken kitchens be avoided. I for one will never take a house so constructed, and I think that underground servants should *strike* and go in for double wages. Builders will do well to turn their attention to this important matter. There is another point which I should like to bring under the notice of architects and builders, and that is the erection of handsome blocks, capable of division and subdivision, combining economy and security;—each suite of rooms to comprise all offices and appliances necessary to constitute a complete and distinct residence; in fact, something after the Scotch fashion, and that which obtains in some parts of Italy. Many families would prefer such an arrangement to the expense and responsibility of a separate house; and many who now take lodgings would be glad to take a block suite. If well planned and on eligible sites near London, the speculation would be a great success, and supply a great desideratum of the present day.

William Wight, late Vicar of Harbury.

CONCRETE HOUSES.

Sir,—In common with most members of the architectural profession, I take great interest in the question of cement concrete for walls; and noticing that a failure had occurred in the construction of a house at Twickenham, I visited the spot. On inquiry, I found that the work had been superintended by Mr. Tall, and that his apparatus was used for the formation of the walls. It appears the walls were carried up in his usual way of 18 inches at a time, between 30 ft. and 40 ft. high, the ordinary door and window openings being left where required. Nothing unusual occurred to cause apprehension of a failure, when suddenly one evening, fortunately after all the men had left off work, a large portion of the walls fell in. The exact cause of the accident I could not gather from the men upon the work. The concrete had been carefully mixed in the proportion of eight to one in measured quantities of Thames ballast and Portland cement. I noticed that the work had broken up in straight courses, evidently at the level at which the machine had been shifted, showing imperfect adhesion at this point. This is undoubtedly a grave defect, and is caused by the wall being formed in layers, or courses, 18 in. in height, and the concrete of one layer setting before the next is added. How far the bolt-holes which are left in the walls for the purpose of fixing the machine may have contributed to this failure, is difficult to say; but, from appearances, it seemed to me that they would considerably help to increase or extend a fracture already begun in the work. Being somewhat puzzled to account for the *original* defect, I was led to examine the boundary-walls, which are constructed in precisely the same manner; and upon a close inspection I noticed minute cracks occurring at certain intervals, and extending from the top to the bottom of the wall. Now, it appears to me that these cracks must be due to the contraction of the material in the process of drying; and it is just possible that one of these cracks, occurring between a series of openings in the wall, caused its destruction.*

Artifex.

THE FAIRFORD WINDOWS.

Sir,—Your correspondent, Mr. J. G. Waller, has written a very long letter to prove that he is not of Mr. Holt's opinion respecting the Fairford windows,—for that is all he does prove,—and I have no doubt that Mr. Holt will cheerfully allow him to enjoy the conviction he entertains as long as he pleases. Who Mr. J. G. Waller may be does not appear from his letter, but from his initials he is probably the engraver of a creditable work on Sepulchral Brasses, which was published some years ago. His authority, however, as an art-critic has yet to be recognised, and his lucubrations may be safely left to the tender mercies of Mr. Tom Taylor, whose authority in such matters *is* recognised, and who has more than once publicly expressed his opinion that the hand of Albert Dürer is visible throughout the work. I am not going to follow Mr. Waller's example, and inflict my opinion upon you, though it might not weigh less with the public; but he has indulged in

* We have received some other letters on this subject, too late for consideration.

expressions which, while they do not advance his argument, deprive him of the right to complain should he be accused of "impertinence" in return. He is exceedingly facetious and satirical respecting the discovery of the letter A upon the sword of an executioner, in one of the windows,—a discovery which was not made by Mr. Holt, or considered by him of great importance, though it certainly does not militate against his theory. The last paragraph of Mr. Holt's "exhaustive paper" (I use the words of an antagonist), at Cirencester, are, "To me that monogram needs not to be inscribed anywhere on that noble range of windows in Fairford Church; the painter has left on them the more conclusive mark of his great mind and master hand." If Mr. Waller has read that paper, "the savour of impertinence" attaches to his own remarks. Let me, however, do him justice. He has himself made "a *great* discovery." He has discovered that Herod not only commanded the execution of St. John the Baptist, but actually presided at it, on his throne, in his royal robes! "How can we withstand such learning and research?" If Mr. Waller has studied the works of Albert Dürer as deeply as he appears to have studied the Scriptures, there is an end to the controversy. It is consolatory, however, to know, that although Mr. Waller has not been able to "detect a single trace of the especial style of Albert Dürer" in the windows, he thinks "they are fine works of art, and their completeness is such as should make it a matter of importance to insure their due preservation." I trust, therefore, that he will forward his subscription to the fund opened for that purpose: it will, I have no doubt, be received by the treasurer or either of the secretaries of the British Archæological Association, to which Mr. Waller, if he be the engraver, formerly belonged, without any reference being made to his secession from that society, a calamity which it has providentially survived. B. A. A.

ROAD-MAKING.

Sir,—The practice now of repairing highways is by laying on a thick bed of stones, say 4 in. or 5 in. in thickness, covered with road scrapings in a semi-fluid state; then rolled with an iron roller some tons in weight till a surface is obtained resembling the one on roads which have been repaired and used weeks subsequently.

The old system recommended by Telford and others has been to lay on a thin bed of clean, equal-broken material, and when ruts began to appear, the material was raked into them, the surface being kept even, and the traffic as equally distributed over the surface, by means of road-guards, as possible. If from the quantity of traffic one bed was insufficient, others followed as soon as the other material had got bound together, till the strength of the road was made equal to its traffic.

Now, if any of your scientific readers or practical road surveyors can give any evidence as to which system makes the best roads at the least expense, I am sure it will give great satisfaction to members of corporations and local boards, and to none more than your humble servant,

X. Y. Z.

"WOBURN SANDS."

Sir,—The origination of the church here is due to the late Rev. J. V. Moore, rector of Aspley, and a gentleman of some family property. Feeling, as all must long have done, the great church deficiency there (beyond, I believe, a school-room service instituted by the present rector of Wavendon), he offered to "meet" the late Duke of Bedford by competently "endowing" a church on condition of that, &c., being erected. This seems to have been carried out with schools, &c., by the present duke: Mr. Moore having bequeathed (I am locally informed) 5,000*l.* or upwards, for the other object. The gift of a "clock" by a surviving sister was a graceful though minor tribute; whilst the very "rare" tri-centenary organ may, doubtless, cause distant musical visits.

A chapel-of-ease to Wavendon, to which the greater population—then much smaller—belonged at that time, was recommended in accordance with the aspirations of the incumbent, Mr. Fisher, as early as Parry's "History of Woburn," 1831.

Woburn "Sands," though not in that parish, the "Station" being over two miles from the town, were once far known on that line of road. There exists a very rare semi-humorous engraving by Bunbury, representing the "Passing of the Coach,"—a small antique one with the "basket," and a sturdy, blunderbussed "guard" trudging along, nearly knee-deep in sand by the side. This, however, has long been remedied by a deepened hill-cutting (70 ft.), with some raising of good road below: the tall pines on the cliffs having an extremely interesting effect.

To this locality also belong—though attributed to Aspley—the old Fullers' Earth pits, mentioned by Pennant, but of late (I think) perhaps scarcely much less used. A retired "Quakers' Meeting" here is said to be as old as their founder, George Fox. The "purchase" of a "common right" of the poor by a nobleman some seventy years ago, which certainly cannot be considered ungenerous, may interest now, when we read of encroachments with no wish for compensation. Francis, Duke of Bedford (the friend of Fox, &c.), having covenanted, for himself and heirs, to give to the poor of Wavendon, in lieu of their right to "dig turf," &c., on a heath in that parish, a hundred tons of coal yearly, at a time when the price, with carriage, and before even "Grand Junction Canal" extension, was doubtless much higher than at the present day. Whether the quantity has been (liberally) increased with that of population, &c., is not known to the writer.* P.

STROUD NEW RESERVOIR.

Sir,—Can you inform me to whom the Local Board have awarded their premium for the above competition, as there is evidently a great want of courtesy on the part of their officers, who (upon application) do not care to afford the necessary information upon the subject?

The Board seem to have been determined not to afford any assistance to competitors, for they did not provide even a *plan of the site*, and those wanting information had to obtain it the best way they could. A Competitor.

DAMAGES FOR BESPATTERING CLOTHES WITH LIME.

Mr. J. Pitt Taylor, the judge at the Greenwich County Court, gave judgment the other day in a singular case. A young lady residing at Greenwich was passing some buildings in the course of erection at New-cross, when a liquid containing lime fell upon her bonnet and velvet mantle, doing damage to the extent of 4*l.* The land upon which the houses are being erected had been taken on a lease by a Mr. Turner, a builder, and against this person an action had been brought to recover the amount of damage stated. The defendant contended he was not liable, on the ground that another person had agreed with him to do the brickwork of the buildings at so much per rod, and that, in law, such person was a contractor, and would alone be liable. The Judge ruled that this person was, in the eye of the law, the servant of the defendant, and an order was made for the full amount claimed, with costs.

AN ARCHITECT'S BILL.

Jones v. *Knight*.—This was an adjourned case (Ryde County Court), in which defendant, an inhabitant of Ryde, disputed the balance of a bill of 13*l.* 3*s.*, for drawings, surveyings, &c., as an overcharge, 10*l.* having been paid into court.—Mr. Bull appeared for plaintiff, and Mr. Hooper for defendant. It was arranged that the issues of the case should depend upon an item of 5*l.* 5*s.*

Plaintiff examined, said the item in dispute included two sets of drawings of the premises in the Arcade, which he had been ordered by Mr. Urry, defendant's solicitor, to prepare for him. He followed his instructions implicitly, and on sending him the drawings he said they were useless, and he prepared others, which answered the purpose desired. He had, of course, charged him for the first set, which was included in the item of 5*l.* 5*s.*

Defendant examined, said he had not given orders for the plans to be prepared; the first he heard of it was when he received them from his solicitor, Mr. Urry, saying they were useless.

His Honour said, if he employed a solicitor, it was at his discretion to act and order where necessary.

Mr. Urry examined, said he never gave orders for particular plans. He gave Mr. Jones instructions to prepare three plans of the three changes the premises had undergone. The plans were for the purpose of illustrating a case to the counsel in a cause now pending between Mr. Knight and Mr. Hughes. The plans first sent to him were not what he wanted, and he told plaintiff they were not, saying at the same time that they were rubbish. The plans he afterwards received were what he wanted.

Mr. Hooper submitted that if plaintiff did not properly prepare the drawings he was not entitled to charge for them: but his Honour thought it would depend upon from what cause they were useless whether he ought to charge or not; and a Mr. Bull, surveyor, of London, having given evidence as to the charge being moderate for the work done, he gave judgment for plaintiff.

HAMPSTEAD FEVER-HOSPITAL COMPETITION.

We understand that the recommendation of the committee of the Metropolitan Asylum Board is favourable to the design of Messrs. Pennington & Bridgen for the first, and that of Mr. F. Fowler for the second premium. The Board at their meeting on the 10th instant decided not to adopt this recommendation of the committee until they had all had an opportunity of examining the designs, and the matter is therefore adjourned until, this, Saturday. In the mean time permission has been given to the various competitors to send any further printed particulars of their designs for the information of the Board.

Acting upon this permission, one of the competitors, Mr. Snell, has sent in a protest which deserves the consideration of the Board. In the course of it he says:—

"The 'Instructions' issued by you to the six competing architects, stipulated that the designs should surmount the following difficulties, viz.:—

1. That the buildings now to be erected for the accommodation of 104 patients, should be so arranged as to admit of their future extension, and the ultimate addition of other pavilions.

2. That the axes of the pavilions should be (if practicable) north and south.

3. That an adequate site should be left for the erection of a small-pox hospital."

"The design submitted by Messrs. Pennington & Brigden, which I am informed you recommend for the first prize, will not admit of extension or the addition of other pavilions. There is no room without encroaching on the small-pox site for the required additional pavilions, and the ventilation of the one-story buildings being through the roofs, it is not possible to extend the accommodation by building another floor over; and further, provided this objection did not exist, there are no provisional spaces for staircases to the upper stories.

The axes of the pavilions, instead of being north and south (as desired by you) are nearly due north-west and south-east, and consequently the windows of the wards face north-east and south-west, the coldest and dampest points of the compass. If this design be made capable of extension, the piece of ground left will, as I have pointed out, be too small for the erection of a small-pox hospital. Consequently none of the above 'instructions' have been complied with by Messrs. Pennington & Bridgen." . . .

FROM SCOTLAND.

Thurso.—The foundation-stone of the new town-hall of Thurso has been laid with Masonic honours. The whole cost is to be about 2,500*l.* Of this sum nearly the whole has been subscribed, a legacy of 1,000*l.*, left by the late Mr. Alexander Henderson, being the "nest-egg" around which the sum accumulated. The building is to contain, besides the town-hall and public rooms, a library and museum. The following are the contractors for the work:—Mason work, Mr. George Manson, Murkle; joiner work, Mr. J. Gauvie, Aberdeen; plaster work, Mr. A. Smith, Thurso; slater work, Mr. Donald Ross, Thurso; plumber work, Messrs. Johnston & Son, Wick; painting and glazing, Messrs. J. & S. Fife, Aberdeen. The architect is Mr. Mackenzie, Aberdeen.

CHURCH-BUILDING NEWS.

Leaden Roding.—The church of this village has been re-opened. The whole structure has been renovated and restored, commencing with the porch, which has been rebuilt in oak in the old Norman style. The plaster walls have been replaced by rubble, with south stone dressings; while the chancel has also been rebuilt throughout in the same material. The floor has been repaved with Staffordshire tiles, a new open oak roof built, the font restored, and the church reseated throughout with oak benches. The spire, which was formerly in a dilapidated and unseemly condition, has been restored, and a new bell added, the church possessing three bells. New buttresses have also been added throughout to the exterior of the building, and it is proposed hereafter to complete the restorations by adding a new vestry and introducing other minor improvements. The old pulpit has been restored under the direction of Mr. Dowsett.

Wadworth.—St. Mary's Church, Wadworth, after having been internally renovated and restored, has been re-opened for divine worship by the Archbishop of York. The chancel was restored about three years ago, and this year it was resolved to complete the work, which had indeed become a very necessary one. The interior of the church, like the one recently restored at Tickhill, had become thickly coated with dirt and whitewash, and the carved stonework had fallen into a dilapidated state, which was not improved in appearance by the contrast with the renovated chancel. Something like 400*l.* is the cost of the restoration. The work was entrusted to Mr. Athron, of Doncaster, who also carried out the restoring of the chancel. The whole of the stonework in the nave and aisles has been scraped, cleaned, and stuccoed, and the carving where demolished or disfigured restored, and the floor also levelled and reflagged. Open stalls throughout the church have been put in by Messrs. Green & Snowden, of Wadworth. The organ has also, under Mr. Meacock, of Doncaster, partaken of the general overhauling.

Bridekirk.—The foundation-stone of a new church has been laid here. The plans were prepared by Messrs. Cory & Ferguson, of Carlisle.

* At the neighbouring Woburn (town) Consecration something it seems was done for the poor. A recommendation of "Benefactions" to the poor on consecration or re-opening of churches,—"a kind if not useful mode of making them remember it,"—appeared in the *Gentleman's Magazine* about six years ago.

The estimated cost is about 3,100*l.* It is to be built of yellow freestone, and cruciform in structure, consisting of a chancel and nave, with a square tower resting upon pillars, and about 61 ft. in height, rising between the chancel and the nave. The interior of the nave is to be 39 ft. 8 in. by 22 ft.; the exterior, 46 ft. 7 in. by 27 ft. The interior of the chancel will be 29 ft. by 18 ft., and the east end of the church circular, while outside the building there are to be two transepts, each 19 ft. 9 in. by 19 ft. The contractors are, for the masonry, Mr. Henry Graves, of Aspatria; the joiners' work, Mr. Henry Dent, Cockermouth; and the plumbers' work, Mr. Thompson, of Carlisle. The site of the new church is on a portion of the glebe land of the parish close to the present edifice, which is now being pulled down. Towards the cost of the new edifice the sum of 2,400*l.* has already been contributed.

Shimpling Thorne.—The parish church of St. George, which has been under restoration for more than twelve months, has been completed, and the services are now performed in the church. In the late restoration cathedral glass has been used for the chancel windows, except the east, and the old stained glass canopies have been releaded by Messrs. Baillie & Mayer, of London. The floor has been paved with Minton and Hollins's tiles. There are new altar-rails and stalls for the choir, of oak. The chancel restorations were carried out by Mr. J. Maxey, of Louth, from designs by Mr. Fowler, architect, of the same place. The repairs of the rest of the edifice have been much more extensive; new roofs have been added to the nave and aisle, all the chancel arch and much of the adjacent wall of the nave, and all one side of the tower, have been rebuilt, and the whole of the exterior pointed out. The tower arch has been opened out, and a new window of stained glass inserted by the rector, the subjects represented being our Saviour's Transfiguration and Ascension. In the place of the north door a new window has been made, which has thus restored some of the light excluded by the abolition of the modern clear-story windows. The furniture of the nave and aisle is of oak, and the sittings have ends of carved panel-work. The panels of the pulpit, together with the cornice, are the work of a lady, Mrs. Tyrwhitt Drake, of the Thorne.

Windsor.—We learn from an appeal which the vicar and churchwardens have laid before the parishioners that steps have been taken with a view to the re-seating and restoration of the parish church. The estimate is as follows:—1. Reseating of area, alteration of gallery-seats, reconstruction and decoration of other parts of interior, 1,540*l.*; 2. Erecting a chancel, vestry, organ-chamber, and new Royal pew, with the necessary decorations, 2,150*l.*; 3. Entire reconstruction of windows; addition of a large western porch, with circular cloisters right and left, to communicate with the street; new parapets, alteration of tower, &c. (according to plans), 3,650*l.*; giving a total of 7,340*l.* It is not proposed, however, at present, to take any step beyond the exhibition of the plans, which will remain on view at Mr. Griffin's, in the High-street. Three sums of 250*l.*, 150*l.*, and 100*l.*, besides a thank-offering of 25*l.* and a donation of 20*l.*, have been promised, whenever the work shall be commenced. Should these be followed by others of sufficient magnitude to justify an expectation that, with the help of the Church Building Societies, the sum of 3,690*l.* might be speedily raised, steps would be taken to bring the plans in proper form before the parishioners at large, for their approval or rejection.

Fylingdales.—The corner-stone of the new church for this parish has been laid. The object is to provide the parishioners with a place of worship in closer proximity with the largest part of the population than the old one is; the latter being in such an exposed and inconvenient place, that in winter only a small portion of the congregation can attend the services regularly. The church will be built from the designs of Mr. Street, architect.

Buckland Monachorum, Devon.—The parish church is now undergoing restoration and repair, under the direction of Mr. H. Elliott, of Plymouth. The works are being executed by local tradesmen, Mr. P. Blowey being the principal contractor. The building is an interesting specimen of ecclesiastical architecture, and was erected during the reign of Henry VII. by the members of the neighbouring Cistercian abbey, from whom the parish derives its name. The church is interesting from the fact of having formerly numbered amongst its worshippers the great Admiral Sir Francis Drake. An elaborate monument by the elder Bacon, erected in the church to the memory of General Elliott, afterwards Lord Heathfield, the defender of Gibraltar during the siege in 1782, bears silent witness to the fame of another illustrious parishioner. The works now undertaken will comprise the cleaning and repair of the existing oak roofs (now partially covered by plastering), new slating to roofs, removal of the high deal pews and huge western gallery, repair of the ancient carved oak bench ends and renewal of the seating throughout in oak, carved so as to harmonize with the ancient work; new tiled flooring in passages, plastering to walls, glazing to windows, and various other works that may be required to restore the ancient features of the church, as far as possible, to their original appearance. About 1,200*l.* are proposed to be spent on the works, part of which sum is raised by a parish rate, and the remainder by voluntary subscription.

Sopley (near Ringwood, Hants).—St. Michael's Church, after having undergone restoration, was reopened for divine service on Michaelmas-day. It is a cruciform building of Early English date, to which alterations were made in the Perpendicular period. The chancel has been repaired. The original lancets and the lepers' window, which had been blocked up, have been opened out. The modern segmental plaster ceiling to the nave has been removed, and has disclosed to view a fine Tudor tie-beam roof, with tracery in the upper part, and elbow-pieces supported by figures of angels holding various kinds of musical instruments. The walls, pillars, and arches have been cleansed from many years' accumulation of whitewash. Open deal benches, stained and varnished, supply the place of the high old square pews throughout. It is much to be regretted that the funds in hand did not permit of the restoration of the tower (at the west end), and of the noble arches opening into it from the nave and aisles, which are at present blocked up by temporary wood and brick-work. Were this removed, and the deeply-recessed and moulded arches properly repaired, the effect would be remarkably good. The works have been superintended by Mr. Ferrey, and carried out by Mr. J. Tanner, of Sopley, builder.

Houghton-Conquest (Bedfordshire).—The fine old church in this parish is about to undergo restoration. Mr. G. G. Scott, R.A., is the architect, under whose instructions the work will be carried out, by Mr. John Fast, of Melton-Mowbray.

DISSENTING CHURCH-BUILDING NEWS.

Dewsbury.—The foundation-stone of a Congregational church has been laid here. The site of the building is at the junction of the Bradford and Halifax roads. When erected, the edifice will be used in place of the building now known as the Public Hall. The basement floor will contain the school-room, 50 ft. by 44½ ft.; lecture-room, 30 ft. by 22 ft.; infants' class-room, 24 ft. by 14 ft.; and four smaller class-rooms and kitchen. There will be separate yards on each side of the building for boys and girls. These will be approached from the Halifax-road by a flight of stone steps, and from Wellington-road by a side street inclined to the required level of the yard. There will be four separate outer entrances to this floor, two being provided through side lobbies to the school-room. The remaining two will be for the class and lecture rooms. There will also be two separate communications by staircases to the ground floor and gallery, and a minister's staircase to the vestries. The ground floor will consist of large vestry, 29 ft. by 14½ ft. and a minister's vestry, 14½ ft. by 11 ft., with lavatories, &c.; also the main body of church, which will be 87 ft. by 50 ft., with the two side wings containing the entrance vestibules and staircases to galleries and schools. The approaches to this floor will be three in number, the two principal entrances being from the Wellington-road by flights of stone steps to the vestibules. The remaining entrance will be from Halifax-road by level landing to the vestries. A gallery will be continued round the entire chapel, supported on ornamental cast-iron columns. The gallery front will be moulded, divided into compartments by pilasters, and filled in with perforated ironwork on a scarlet ground. The body of the church and the gallery will seat 500 persons each, making the entire seating accommodation of the church at least 1,000 persons. The whole of the seating will have shaped stall ends, low doors, and leaning backs, and the whole of this and other woodwork in the church will be of red deal, stained and varnished. The ceiling of the church will form an ellipse, and will be 37 ft. from the floor in the centre. The style of the architecture will be Italian. The principal front will be towards the Wellington-road, the central portion of which will project from the main wall, and will be surrounded by a pedimental cornice. The main feature in this portion will be a triple-lighted window, divided by Corinthian columns, supporting the arched and canopied head of the centre light, which will be 25 ft. high and 8 ft. in width. The two side lights will be square-headed, and the space below the cills will be filled in with ornamental balustrading. On each side of this central portion, and recessed from it, will be two other windows of similar proportions. The whole of this front and the wings will be constructed of tooled ashlar, from the neighbourhood of Huddersfield; and the remaining external portions of the building will be faced with pitched Elland Edge wallstones, with dressings of Huddersfield stone. The cost of the entire building will be about 7,500*l.* Messrs. John Kirk & Sons, of Huddersfield and Dewsbury, are the architects. The contractors for the various works are as follow:—Mr. G. W. Fox, of Ossett, mason; Messrs. Moulson & Hollings, of Bradford, joiners; Mr. George Shaw, of Mirfield, plasterer; Mr. Thomas Yeoman, of Dewsbury, plumber and glazier; Mr. John Brook, of Huddersfield, painter; and Messrs. T. A. Heaps & Co., of Huddersfield, ironfounders and smiths.

STAINED GLASS.

St. Michael's, Alnwick.—Three stained glass windows, in memory of the late Algernon, Duke of Northumberland, are about to be placed in this church.

Ashford Church.—A memorial window has been placed in the south chancel of this church, to the memory of Richard Greenhill. The window is by Mr. Wailes, of Newcastle.

Tollard Royal Church.—A painted window has been placed in the east end of the north aisle of this church, to the memory of the Hon. Alice Arbuthnot, who was killed by lightning on her wedding tour while ascending the Schelthorn, in Switzerland. The window has three compartments. In the centre one at the top is a half-length representation of the Saviour blessing little children. Below these is a full-length female figure, with upturned face, the arms extended and raised, as if in the act of ascension. The north compartment contains two figures, representing the wise and foolish virgins. In the south light are two figures, representing orphan children, one holding an infant in its arms, while a third figure represents Charity. The stained glass is protected by plate glass outside, the size of each compartment, as well as by a wire guard. The window was painted by Bertini, of Milan.

Town Church, Guernsey.—A memorial window, lately set up in this church, and completing the stained glass of the whole east end, has been placed by Mr. Bonamy Dobrée, of London, to the memory of his father and his son. The design is founded upon the subject of the nativity of our Lord and His manifestation to the Gentiles. The window consists of three main openings, of considerable dimensions, and a flowing tracery of *Flamboyant* character, having nine openings. In the lower portion of the centre the infant Jesus is shown lying in a crib in the manger, the Virgin Mary being immediately behind him kneeling and in the attitude of prayer. Joseph stands by, bearing his staff, as having been journeying. In the background are the ox and the ass, and ruined buildings which formed the stable. The compartment on the dexter side of this contains figures of the three wise men or Magi. On the sinister side is a group of worshipping shepherds. Above all these groups, and extending through the three main lights, and also through the eight opes of the tracery, the entire is filled with the Heavenly Host, the angels in the centres bearing a scroll with the sentence, "Glory to God in the Highest," the other angels bearing and playing upon musical instruments, the topmost opening in the tracery having the Star of Bethlehem. The three main lights are enclosed within a border, which forms a framework to the whole picture, composed of the vine

foliage and fruit. This is upon a ruby ground. The artists were Messrs. O'Connor, of London, who had previously placed three other large memorial windows in this church.

St. Nicholas's Church, Newcastle.—A memorial window, of large dimensions, has been erected in this church, at the cost of Major Spoor. The window is one of a series at the north side of the church, and consists of four lights with Decorated tracery. The first compartment contains "The Agony in the Garden;" the next is filled with "Our Lord bearing the Cross;" in the third opening is "The Entombment of Our Lord by Joseph of Arimathea." Next follows a scene after the resurrection, "The Marys at the Tomb." The tracery is filled with an angel, and the monograms of the family are surrounded by foliage. The window is the work of Mr. Baguley, of Newcastle-upon-Tyne.

SCHOOL-BUILDING NEWS.

Kerry (Montgomery).—The Kerry new schools have been erected from the designs of Mr. David Walker, of Liverpool, and are built upon a site presented by the Rev. W. Morgan, B.D., vicar of Kerry. The front view of the schools is towards the road leading from the Sarn, the building being placed upon the same frontage as the Reading-rooms, erected some years ago by Mr. Naylor, which form a group. The new building is designed for National Schools. The plan consists of two separate rooms, each 40 ft. long by 18 ft. wide, with class-rooms attached to each about 14 ft. to 17 ft. The height of the wall-plate is 13 ft., and about 28 ft. to the ridge. The roofs internally are open, timbered with curved braces of pitch-pine varnished, the open spaces between the spars being plastered. The floors are laid with selected pitch-pine, the walls being coloured with a warm salmon tint upon the brickwork, a skirting of about 4 ft. high being carried round the walls in oil paint of a dark chocolate colour, and capped with an ornamental stencilled border. The boys' school is entered from the east, or principal front, the girls' entrance being on the west front, and leads from their enclosed playground. Both of these entrances are laid with tiles from a design of the architect. The building has a tower, with slated spire and ornamental iron finial, rising to a height of 45 ft. over the boys' entrance, and fitted up with a cast-steel bell by Vicars & Co., of Sheffield. The tower is broken up by openings, filled in with ornamental projecting louvre boards. The chimney-shafts spring from the square into the circle. The walls externally are constructed of Bower's light yellow Ruabon bricks, and are laid in Flemish bond with a wide mortar-joint, which is ruled in a beaded form. The roofs are slated with Bangor slates, the ridge crests of red clay being manufactured from the architect's design by Mr. Peake, of Tunstall. The glass used in the windows is of Harley's ribbed manufacture. Accommodation is provided for 130 boys or girls. The ironwork was supplied by Messrs. Smith, of Birmingham. The works, from the plans of Mr. Walker, were carried out under the superintendence of Mr. James Martin, by the staff of workmen on Mr. Naylor's Kerry estate, the dressed stonework being supplied by Mr. James Porteous, of Welshpool.

PATENTS CONNECTED WITH BUILDING.

Apparatus for Warming Buildings, &c.—*W. A. Herring.* Dated 4th December, 1867.—Here the patentee causes the exhaust steam from the engine to pass a coil of pipe of such diameter that the back pressure on the engine may be insignificant. This coil he encloses in a cistern or close tank with which pipes for warming the building are connected. The outlet pipe passes away from the top of the cistern or tank, then circulates through the rooms or buildings to be warmed, in the ordinary way of a hot-water apparatus, and afterwards the pipe returns the same water in a comparatively cold state to the bottom of the cistern or tank. This water remains in the cistern or tank until it again becomes hot, and then it again circulates through the pipes of the hot-water apparatus. In this way the rooms or buildings are warmed without other fuel than that necessary to keep the high pressure steam-engine at work, and at the same time an economy of water is effected, which sometimes is of importance, the exhaust steam from the engine being condensed into a pure water, which is returned into the boiler.

Bricks, &c.—*T. W. Walker.* Dated February 5th, 1868.—The patentee claims, first, the general construction, arrangement, and combination of machinery or apparatus for the manufacture of bricks, tiles, slabs, and other like articles, as described and illustrated by the drawings; secondly, the combination with the pistons or plungers of machines for compressing bricks, tiles, slabs, and other like articles of a self-acting expanding packing, arranged and operating substantially as described; thirdly, the moulding and compressing of bricks, tiles, slabs, and other like articles on a bed-plate or table, by the aid of a mould-box or frame and piston or plunger, substantially as described; fourthly, the peculiar composition or compound for the manufacture of plain or ornamental tiles and slabs, as described; fifthly, the production or manufacture of ornamental tiles by punching or perforating holes or openings through such tiles according to any desired pattern, and filling in such perforations at the time of laying the said tiles with mosaic work, or with other tiles of a more or less ornamental character, as described.

Heating Buildings, &c.—*W. Oram.* Dated January 23, 1868.—These improvements consist in taking or receiving the steam from the boiler or steam generator into the first length of pipe, and continuing such piping to any required length throughout the building, and returning the steam to the boiler by introducing the last length or other extremity into the boiler below the water-line. A tap or valve is applied at the entrance-pipe to control the admission of steam, and another is provided at the termination or exit, near where the pipe enters the boiler, by which tap water is withdrawn from the heating-pipes, and by such combined means the constant circulation of the steam is effected, and an increased heat obtained from the pipes.

Doors, Shutters, and Bell-knobs.—*J. C. Sanders.* Dated 23rd January, 1868.—A mould of metal or other suitable material is prepared of the shape or form which it is desired the exterior of the knob or other articles shall possess, and glass, either coloured or colourless, is poured therein in a molten state. Any desired pattern is then impressed upon the upper surface of the molten glass whilst the latter is in the mould by means of suitable stamps or dies. When cold and hard the glass is removed from the mould, the edges trimmed, and such portions of the impressed pattern as it is desired shall be of a different colour or colours from the rest of the glass are painted. The glass is then placed in a metallic mounting in the manner well understood by persons connected with the manufacture of such articles, the effect of brilliancy being given to the pattern by placing metallic foil or other suitable burnished or polished material of any desired colour or colours between the glass and the metallic back or mounting.

Books Received.

Geological Table of the British Fossiliferous Strata. Compiled by Sapper William Parsons, R.E.

This seems to be a well-arranged and useful table, compiled from the works of Lyell, Murchison, Tennant, and others. It gives a compendious list of fossils characteristic of the various strata, which are arranged in the order of superposition. In the column for "Remarks" there is one which might have been usefully extended to other instances besides the one in point. The remark is in reference to Portland stone. A table of great use to architects and builders might be compiled in a similar form to this one, but containing many such remarks. In reference to the lowest "Typical Group of Rock," the Laurentian, which is stated to be "devoid of fossils," it must be remembered that this is a table of British fossiliferous strata, and hence does not include the Transatlantic Laurentian rocks.

VARIORUM.

The *Quarterly Review* for October is a specially good number. Amongst the more interesting papers are the leader on the Great Railway Monopoly, and one on Lake Dwellings. The leading paper advocates the transfer of the railways to one consolidated management, under Government auspices, and we are of opinion that this is really desirable. As an example of what may be anticipated under such an arrangement we may quote what is said on the Belgian system:—

"Let us now glance at the results of the bold policy adopted by King Leopold in providing for his kingdom,—then the youngest member of the family of European nations,—a system of railways at the public cost, at a time when other nations were indifferent, if not actually hostile to their formation. At the beginning of the enterprise the prophets of evil were in the ascendant. They were able to point to the constantly increasing annual deficit on the working of the lines. Excepting in the year 1836, when there was a gain of 37,000 francs, the loss went on increasing until it amounted to 30,000,000 of francs yearly. This loss was, however, more apparent than real, being principally occasioned by the payment of interest on unproductive capital while the lines were still under construction. But by the end of 1852 the State railways were nearly all made and at work, and then the tide began to turn. Year by year the apparent loss was reduced, until at length not only was the interest on the borrowed money all paid, but a substantial profit was shown on each year's working. In 1858 the net profits, after providing for all interest and outgoings, was 5½ per cent. on the capital expended; in 1860 it was 6½ per cent.: and now it is 7 per cent. The principal of the debt incurred in constructing the lines is in course of annual reduction, and if the revenue continues to increase as heretofore, not only will all the Belgian railways become the unburthened property of the State, but they will contribute in no small degree to the reduction of the ordinary taxation of the country."

Some interesting statistics in reference to our own railway system are given. One of the most startling facts brought to light by the railway traffic returns annually published by the Board of Trade is the comparatively small average number of passengers carried per train. Every one must have been struck with the frequent long and empty trains travelling on railways, but few, we dare say, would be prepared even from these for such a result, in illustration, as this, that to accommodate 4,482 passengers 13,512 seats should be given, or 1,274 to accommodate 179! This, of course, is done under the mistaken idea that it is for the public accommodation all this absurd waste is incurred; but how can the public be accommodated in such a way as this? It goes towards accounting for low dividends and high fares, but there is something radically wrong in the management which renders it possible. In respect to Irish railways the whole system, it appears, might be purchased at present, for 22,000,000*l.*, or less than one year's expenditure on our army and navy. There are 333 Irish railway directors, 70 auditors, 35 secretaries, and 13 general managers, all of whose functions would be much more satisfactorily performed by one efficient executive sitting in Dublin. Let us hope that "Her Majesty's highways," which have for long been superseded, will soon be replaced by "Her Majesty's railways."——"A Treatise on Optics; or Light and Sight theoretically and practically treated; with the Application to Fine Art and Industrial Pursuits. By E. Nugent, C.E., of New York. London: Virtue & Co." This is an American offering to those interested in technical instruction amongst the industrial classes. The author has steered pretty clear of abstruse mathematical investigation and formulæ, and yet his book is capable of giving an accurate enough knowledge of one of the most interesting and useful branches of science. The treatise seems to be one capable of being made useful not only to artists, but to mechanics and artisans generally, and as a text-book for schools and colleges for both sexes. The style is clear, and the instruction plain and intelligible. The author has had specially in view its utility to the house decorator and painter, the builder, architect, draughtsman, engineer, and others connected with the building trades, as well as those engaged in various other branches of industry.

Miscellanea.

Fall of three Houses at Holloway.—On Sunday morning, about eight o'clock, three houses that had lately been erected in the Holloway-road, adjoining the Tottenham and Hampstead Junction Railway, fell with a great crash. Fortunately no one was in the houses, or passing at the time. The cause of the houses falling ought to be ascertained.

The Parkin Jeffcock Memorial Fund.—A meeting of the friends of the late Mr. Parkin Jeffcock was held in Sheffield last week, when it was decided to proceed at once in the erection of a memorial church, in sympathy with the Oaks Colliery calamity of 1866, at Mortomley, to accommodate about 260 persons. A design by Mr. Butterfield was approved by the committee.

Technical Education.—On Saturday, October 10th, classes in connexion with the Science and Art Department were opened at the Slough Mechanics' Institution for the study of practical plane and descriptive geometry, mechanical and machine drawing, building construction, and architectural drawing. About twenty-five students have already joined, and the classes (which are under the direction of the Messrs. Dorrell) promise to be successful.

South Staffordshire Industrial and Fine Arts Exhibition, 1869.—The Guarantee Fund, which the committee determined should be fixed at a minimum of 2,000*l.*, to be limited to 10*l.* each guarantor, is now complete, and the list of 200 names includes very many of the wealthiest and most respected names of the whole district, names which guarantee not only a much larger sum than 2,000*l.*, if it should be necessary, but also the thoroughness of the scheme, and, as far as they possibly can, the prospect of its entire practical success. Molineux House and grounds are also now taken for the purpose of the exhibition.

Gas Regulation.—An account is given in the *American Gaslight Journal* for the 2nd of October of an invention patented by Mr. E. Beggs, of San Francisco, for the regulation of gas burners. By means of a small apparatus containing levers, valve, &c., applied to the gas-pipe supplying the burners from the meter, or to the burners themselves, the amount of pressure is equalized, so that whether a smaller or a larger number of burners are used, or whether the gas be at high pressure or low, no gas shall be wasted by undue pressure. The invention is said to be in operation at the office of the journal in Pine-street, New York.

Encouragement for Others.—On Thursday evening, the 15th instant, the vestrymen and members of the Board of Guardians for the district of Chelsea, which Mr. Tite, M.P., has long represented in the Metropolitan Board of Works, entertained him at dinner, in testimony of the services he had rendered in Parliament in the passing of the Act authorizing the construction of the Thames Embankment at Chelsea. The entertainment was given in the Vestry-hall, King's-road, Chelsea, and about 200 of the principal inhabitants took part in it. Sir Charles Wentworth Dilke, M.P., presided; and Sir John Thwaites, chairman of the Metropolitan Board of Works, with several of the members of that body, and the Rev. Mr. Burgess, incumbent of Trinity Church, Sloane-street, occupied seats on his right and left.

Railway Gardens.—A company has been formed to rent, for sixty years, from the various railway companies having lines through the east, middle, and south of France, the right to plant and cultivate fruit-trees on whatever portion of the sides of the line is found suitable. The trees will be trained on metal espaliers, and those kinds planted according to the situation. Gooseberry and currant bushes are to be made to flourish in the least favourable spots, but pears will form the staple crops. The first five years no rent is to be demanded. The idea is not new, as those who have travelled on the German lines can recall the thrift displayed in cultivating these waste spots, in Luxembourg particularly. It is to be hoped, however, that the company will be restricted from obstructing the views of the country with their trees.

Sussex Archæological Society.—The autumnal meeting of this society has taken place at Lewes, where Mr. M. A. Lower, as usual, became Coryphœus, the Rev. Edward Turner, V.P., being at his post. The Hon. Secretary, Mr. Francis Barchard, the Rev. William Powell, and several of the leading clergy and gentry of the district, were present. In the course of the day the objects visited were Kingston Church and Manor House, Iford Church, Rodmell Church, and the site of a British cemetery on the Rodmell Downs, where excavators were employed to dig into some of the twenty-six barrows which indicate the site of the cemetery, and where human remains were found. Mr. Lower explained the churches of Kingston and Iford. The Rev. P. de Putron did the same for Rodmell, and also read a paper on the hill cemetery. Hospitality was exhibited, *en route*, by Mr. Joseph Cooper, F.S.A.; Mrs. Rosseter, Iford Manor House; and the Rev. P. de Putron. A luncheon took place at Rodmell, and the party, numbering upwards of fifty, enjoyed one of the most pleasant "outings" that the society has ever had.

Marple Church. — Narrow Escape. — On Sunday before last, before the congregation had all left the church in the morning, a large portion of the cornice which encircles the candelabra and gasfittings fell from the ceiling into the middle aisle of the church. Fortunately no person sustained any injury.

Ancient Remains in France.—The *Journal des Landes* mentions discoveries that have been made at St. Cricq, near Ville-Neuve-de-Marsan. These remains consist of antique walls of great thickness, of rooms adorned with mosaics, and in good preservation. In the River Sèvre, also, sunk beneath the bottom, have been found the remains of a boat, which probably belonged to the Normans.

Loughborough Park Village.—The works on this estate, which have become the property of the Suburban Village and General Dwellings Company, have been commenced. It is proposed to erect on this estate about 650 houses, each to have a garden. Plans have been prepared. The houses are to be in price from 200*l.* upwards, payment to be made in the shape of rents, extending over fourteen years.

Liverpool.—Although the Liverpool corporation has long been considered one of the wealthiest in the kingdom, the inhabitants are now complaining bitterly of the pressure of local taxation. At a recent meeting of the town council, Alderman Dover pointed out that the local taxation has risen since 1858 from 5s. 1d. in the pound to 7s. 4½d. In addition to this, the corporate debt is now 5,000,000*l.*; and recently no less than 21,000*l.* had been spent in obtaining thirty-four bills, which involved an expenditure of 1,000,000*l.* Another speaker complained that the original estimate for the Sefton Park had risen from 85,000*l.* to about 250,000*l.*

A New Steam-Engine.—An extremely simple steam-engine, in which piston, crank, steam-chest, &c., are dispensed with, has, it is said, been invented by Mr. Benjamin Franklin, of Westmoreland, Penn., U.S. It depends entirely upon centrifugal force; friction is almost entirely overcome; and it will produce 1,500 revolutions per minute with one-fourth the steam usually required, although the same amount of horse-power is developed. This centrifugal steam-engine condenses almost all its steam (which in itself is a great saving), whilst from its simplicity it can be constructed at one-fourth the ordinary cost, and is not liable to get out of order.

Obtaining Water at any Depth. — Experiments have been made, on the grounds of Richmond Villa, with Messrs. Watson & Baker's newly-patented invention for obtaining water. The Hon. Edward Erskine, accompanied by several scientific gentlemen connected with her Majesty's Government, were conducted by the patentees to the spot, and two gentlemen representing the Russian Government, and others from the East-India service, attended, all of whom expressed themselves gratified at the result, water being obtained in less than an hour. The water so obtained, it is said, can be pumped up from any depth, and conveyed into the top rooms of the highest house.

A Hint to Lecturers.—Many lecturers have felt how unsatisfactory it is to write or draw, or in any manner attempt to illustrate their ideas in a large room. Professor Albert R. Leeds, of Haverford College, Pa., suggests that this difficulty may be overcome thus:—A plate of glass is placed in the lime-light or magnesium lantern, and an inverting prism is put in the forward part of the draw-tube of the objective. If, now, while lecturing, writing is done with an ordinary pen and Indian-ink upon the glass plate, proceeding from left to right upon the plate, it will advance correspondingly upon the screen, and will be read in greatly enlarged characters by those present. The square prism inverts with respect to bottom, and the writing being actually reversed by the writer in reference to the other direction in which the lantern is pointing, the crossing of the rays produced by the lens becomes in this case an advantage, and corrects the letters upon the screen. A collodion film, blackened by exposure to the sun's rays, may be substituted for a naked glass plate with great advantage. On such a film chemical and mathematical formulæ, drawings of apparatus, machinery, and so on, may be cut with delicacy, and appear as intensely bright white lines on a black ground, and with something of the appearance of an immense copper-plate engraving.

"Associated Arts Institute."—The opening *conversasione* will be held on next Saturday evening, the 31st inst., when the president, Professor Westmacott, R.A., will make an address. A remarkable collection of drawings (never before exhibited) by the late Sir R. Westmacott, R.A., will be on view. For ensuing meetings a number of papers are promised, by Mr. Soden Smith, Mr. R. Redgrave, R.A., Mr. Ellis Wooldridge, Mr. Bateman, Mr. Cave Thomas, Mr. A. Hart, R.A., and others.

The Arundel Society's Publications.—The Council announces "An illustrated description of the Arundel Society's publications during a period of twenty years." The whole of the publications, including the ivory carvings, will be photographed one-fifth the size of the originals, and arranged chronologically according to the years in which they were issued, whether as annual or occasional publications. The letter-press will give a full description of the works, arranged in a similar manner.

Manchester Jews' School.—The foundation-stone has been laid of a building about to be erected from designs of Mr. E. Salomons, in Derby-street, Cheetham-hill-road, as a school-house for Jewish children. Mr. Edward Nathan, the president of the institution, laid the stone in the presence of a considerable number of the members of the Jewish congregation. A dinner in celebration of the event was given by Mr. Nathan, at the Queen's Hotel, and amongst the company were Mr. Thomas Bazley, M.P., and Mr. Jacob Bright, M.P.

Means of making Paint adhere to Zinc.—It is a difficult matter to get a coat of paint to adhere well to zinc, which rapidly oxidises when exposed to air and moisture; and, as most engineers know, galvanised iron goes very quickly when once the covering of zinc has decayed. Many means have been tried to obtain the firm and close adherence of paint to zinc. The last we have met with is due to Dr. Bottger, who professes to have completely succeeded. He makes a solution of one part of chloride of copper, one part of nitrate of copper, and one part of chloride of ammonium in sixty-four parts of water and one part of commercial hydrochloric acid. This solution acts as a sort of mordant. It is paid with a wide brush over the zinc, which immediately becomes a deep black colour, forming, according to the Doctor, a basic chloride of zinc, and what he calls an emorphous brass. The black colour changes in the course of twelve or twenty-four hours to a gray, and upon this gray surface any oil paint will dry, and give a firmly-adhering coat. Summer heat and winter rain will have no effect in disturbing this covering, which affords complete protection to the zinc.

Finsbury Park.—On Monday night a public meeting was held in Myddelton Hall, Islington, for the purpose of protesting against the proposed building on Finsbury Park by the Metropolitan Board of Works. Mr. W. T. M. Torrens, M.P., presided. Mr. Alderman Lusk, the other member for Finsbury, was also present. The following resolutions were passed:—"That this meeting views with great surprise and regret the course contemplated by the Metropolitan Board of Works to dispose of a large portion of the ground already purchased, and positively required, for the purposes of the Finsbury Park; and feels certain that, if the intention of the Board be carried out, the object of the Legislature will be frustrated, a great injustice will be inflicted upon the inhabitants of the borough, and the usefulness and beauty of the park as a place of public resort will be materially and permanently injured." "That a memorial be signed by the chairman on behalf of the meeting, and presented to the Metropolitan Board of Works by a deputation to be headed by the chairman." "That, failing to obtain a satisfactory reply from the Metropolitan Board of Works, a Bill be prepared to amend the Finsbury Park Act of 1857, having for its object the preservation for the use of the public of the whole of the 131 acres purchased; that the borough members be requested to carry such into the House of Commons; and that they, together with the county members, give the said Bill their utmost support. Further, that the assistance of the Government and the Open Spaces Association be respectfully solicited." Among the speakers were Alderman Lusk, M.P., the Rev. R. Mackenzie, Dr. Harvey, Messrs. C. H. Elt, A. Walker, R. W. Phillipps, R. S. Cufflin, and J. Vincent.